Louisiana CONSERVATION REVIEW

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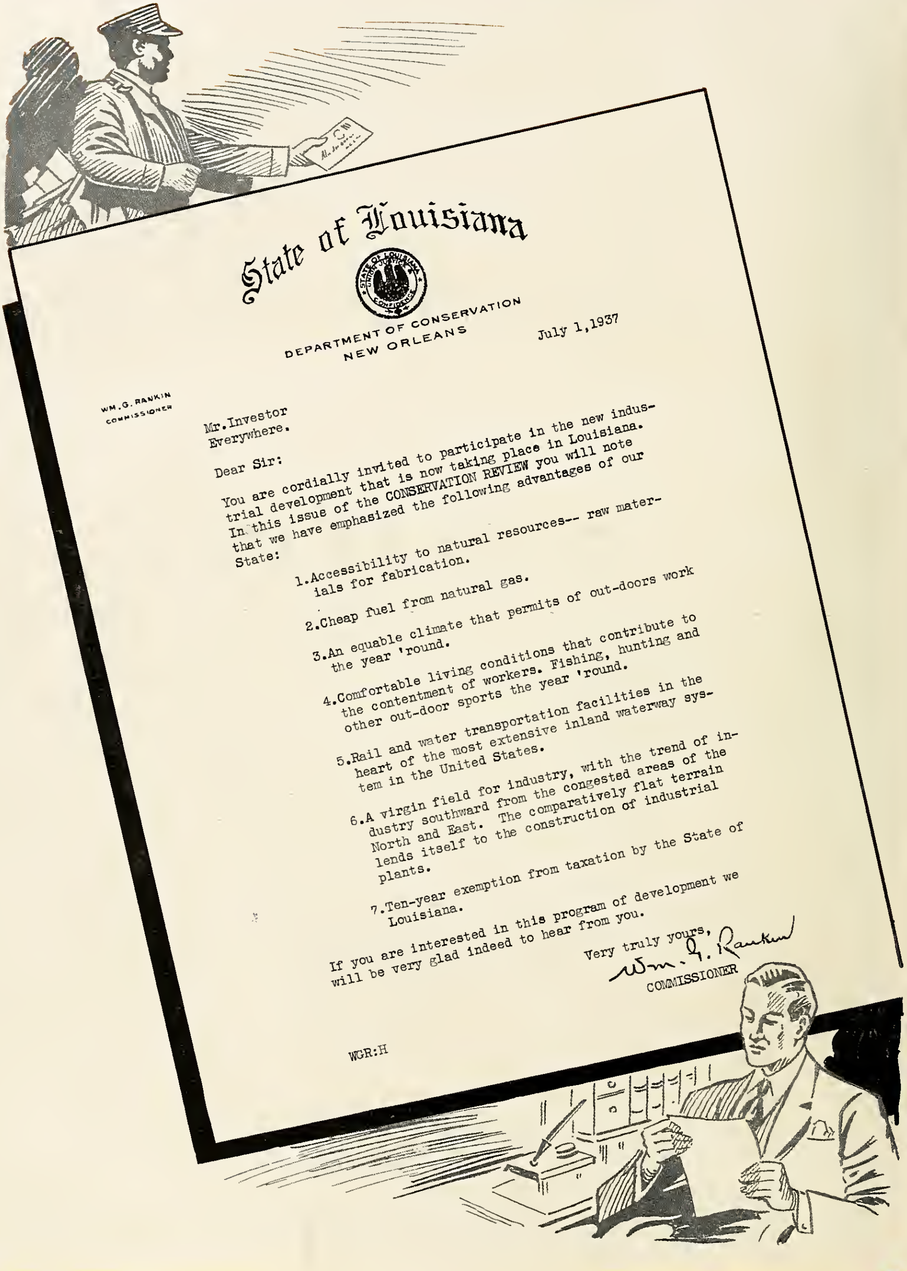

State of Louisiana

DEPARTMENT OF CONSERVATION
NEW ORLEANS

WM. G. RANKIN
COMMISSIONER

July 1,1937

Mr.Investor
Everywhere.

Dear Sir:

You are cordially invited to participate in the new industrial development that is now taking place in Louisiana. In this issue of the CONSERVATION REVIEW you will note that we have emphasized the following advantages of our State:

1.Accessibility to natural resources-- raw materials for fabrication.

2.Cheap fuel from natural gas.

3.An equable climate that permits of out-doors work the year 'round.

4.Comfortable living conditions that contribute to the contentment of workers. Fishing, hunting and other out-door sports the year 'round.

5.Rail and water transportation facilities in the heart of the most extensive inland waterway system in the United States.

6.A virgin field for industry, with the trend of industry southward from the congested areas of the North and East. The comparatively flat terrain lends itself to the construction of industrial plants.

7.Ten-year exemption from taxation by the State of Louisiana.

If you are interested in this program of development we will be very glad indeed to hear from you.

Very truly yours,
Wm. G. Rankin
COMMISSIONER

WGR:H

"I have a story to tell"---said the Commissioner*

----and he tells it here

The candid camera catches the Commissioner in the middle of his story.

"Mr. Smith, you are a business man. I judge you are a successful business man.

"Probably you have reached the point where your business is expanding or else you are seeking investment in some other line that is directly or indirectly related to your own.

"Well, I will try to talk your language, for after all the State of Louisiana is in business—BIG BUSINESS. Its principal assets, outside of its own people and the faith of out-of-state investors in its bonds, are its own natural resources.

"We think we know what Nature is, of course, and Webster defines resource as 'that to which one resorts for supply and support.'

"Now in natural resources Louisiana leads all other states of the Union. It may be surpassed by other states in the volume or output of several of its varied resources, but no other state can offer so many and such diversified resources that are the gift of Nature, or of God, as you will.

Conservation Pioneer

"Some years ago the people of Louisiana, and their representatives in the state legislature, realized that these resources might be wasted or dissipated unless there were a determind effort and a definite program to conserve them, so that Louisiana became a pioneer in the conservation of her natural resources.

"I do not say that the early pioneers could envision where the movement might lead—their interest at first was primarily in the preservation of our wild life and our more apparent natural resources, for the benefit of future generations—perhaps they did not appreciate the full significance and possibilities of conservation, what it might mean to the material well-being and happiness of our people, the present generation, if these resources are not only conserved but utilized and developed.

"We not only have the opportunity to develop these resources through more intensive cultivation, but to greatly enhance their value through conversion and manufacture.

"I should say that at present prices the production of our natural resources, from forest and stream, land and water, will total a quarter billion dollars annually. A lot of money, in any man's language.

Looking Ahead

"But if we interest outside capital in the promotion and development of our industries we will double, even treble, the value of our products. Yes, it is conceivable that the finished products and derivatives of our natural resources, will touch the half billion mark within a very few years.

"Let me give you an illustration, which you, as a business man, will understand.

"We have here in Louisiana a very elaborate system of fire protection for our forests. Our Division of Forestry maintains a permanent organization of over 300 members, excluding our game wardens, whose duties are to protect our forests from fire and develop our future timber supply. In 1935 only 1.4 per cent of the protected forest lands were burned over—on a total area of 5,900,000 acres there were 2400 fires, which burned 82,998 acres.

"That is practical conservation, but we have gone a step further. You, as a business man, will be in-

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*William G. Rankin, Commissioner, Department of Conservation, State of Louisiana.

Library
Louisiana State University

terested in our reforestry projects. Dreams do sometimes come true, as we see the vision of our early advocates and pioneers of reforestation here in Louisiana.

"Louisiana is a leader in reforestation. During the past four years her timber growth has exceeded her cutting rate. We are assured of a timber supply for many years to come—all the pine and hardwood timber that the consuming public may require.

Forest Resources

"The forest acreage of our state totals 19,200,000 acres. Various stages of timber growth, from the denuded piney woods lands of western Louisiana to the virgin timber tracts of the long-leaf and short-leaf pine forests and the hardwood bottoms of the Mississippi River.

"We have on hand 1,200,000 acres of merchantable timber; there are 10,000,000 acres that are fully stocked and growing pine and hardwoods for the coming generation. In addition there are approximately 7,000,000 acres in need of intense protection so that their partial growth can be increased to normal capacity.

"Well, you are not in the lumber business, you say—what does all this mean to you?

"Just this—with the establishment of our permanent forestry program the paper industry has been developed. We now have six large paper mills that are using 400,000 cords of wood annually, producing 200,000 tons of pulp. A large proportion of this pulp is converted into paper bags right here in Louisiana. The operating cost of one large mill is $5,000,000 a year, so you see it is no small industry.

New drilling technique has followed discovery of oil salt domes in Louisiana coastal waters.

"Take the naval stores industry, in which Louisiana was at one time an important factor. With this second growth of timber it is being reestablished — rosin and turpentine are most useful in our commercial life, as you know.

"We also have here in Louisiana large distillate plants that convert the old pine stumps and dead pine tops into pine oils, which are re-distilled into medicinal and industrial articles, such as disinfectants and other derivatives.

"To prevent these fast-growing timbers from decaying prematurely they are impregnated with rot-resisting chemicals, such as creosote—quite an industry in itself.

"This may suggest to you some investment in a business that is perhaps indirectly related to your own. But our natural resources are varied and interesting—let us continue our excursion in some other field.

"To me our fishing and trapping industries are most fascinating, probably because they are associated with the sports of my youth and the recreation of a large proportion of our male population. But don't get the idea that it is merely a diversion with us—it is business, BIG BUSINESS at that.

"Did you know that Louisiana supplies 75 per cent of the musk-rat pelts of the United States? While the range of this fur-bearing animal in southern Louisiana is not extensive, over 6,000,000 have been taken in a single year. Valued at over $6,000,000, wholesale.

"When it comes to fishes we now offer you the Louisiana sea shrimp, headless. Now that we have taken their heads off, and pack them in modern refrigerator cars, we have solved the problem of perishability, so that this sea food now appears on tables in far distant corners of the country—the catch of thirty to forty million pounds annually yields our fishermen from $1,500,000 to $2,000,000.

The Louisiana Oyster

"Next in value and importance is the Louisiana oyster, which is cultivated in bedding grounds along the Louisiana coast. There are approximately 500,000 acres suitable for oyster beds in the mixture of fresh and salt water on this coast.

A catch of speckled trout from Placquemines parish waters.

"We consider the Louisiana oyster the finest in the world and with our new distribution and refrigeration facilities its commercial development will be rapid. The establishment of sea food restaurants in interior cities and towns will help to stimulate a demand that will take care of the increasing supply, which now amounts to nearly a million barrels annually, valued at over a million dollars.

"Mr. Smith, if you would like to engage in a new business venture that will give you plenty of out-door exercise, the State of Louisiana will lease you oyster beds at a nominal rental of $1.00 the acre per annum—the rest of the performance will be up to you.

"It is interesting to note here that the iodine content of our oysters and shrimp—in fact, all of our sea-food, fruits and vegetables—is so much greater than in other parts of our country that scientists have advanced this as a plausible explanation for the comparative infrequency of goiter encountered in south Louisiana.

"Consider the oyster shell as an illustration of the ramifications of related industry. A basic food for chickens—and yet, strange to say, with the largest city in the South here at our door-step as a consuming outlet, we have no large poultry farm in this vicinity—that is, one of the first magnitude.

And the Crab

"Another fishery product that is fast gaining in favor with the public is our blue-shell crab. Louisiana hard-shell, soft-shell and packed crab-meat now have a value of over half million dollars annually—in fact, this industry now supports a number of packing plants at Morgan City and gives employment to more than 600 people.

"The revenue from our salt-water fisheries will total from two to three million dollars annually. From our fresh waters the buffalo fish, catfish and other fishes will yield about the same income. Besides our amateur anglers, thirty to forty thousand in number, we have over 8,000 commercial fishermen and others engaged in transporting fishery products from the fishing grounds to market, in the wholesale trades, and in preserving fishery products.

"This will give you some idea of the commercial possibilities of an industry that is fascinating and unique. By the way, did you know that raw oysters are now considered superior to liver for the prevention and treatment of aenemia?

"Incidentally, it will interest you to know that the enterprise of our oil men, in drilling for oil in the shallow waters of our coastal region, posed an unusual problem for this Department, with the possibility of oyster beds being contaminated by the oil. We had no desire to curb the enterprise of this new-found industry, nor could we tolerate such a condition; but happily certain regulations as to the construction of barges and rigs seems to have solved the difficulty.

"A feature in which our Department is especially interested, in that it is strictly in the line of conservation, has been the construction and maintenance of our state fish hatcheries, where game fish are propagated and cultivated for the purpose of restocking depleted streams and stocking private lakes and ponds.

"Please do not overlook the fact that climatic conditions in Louisiana permit of industrial operations out-of-doors throughout the entire year. Industry is not handicapped by the severe Winters which prevail in other sections.

"And out-doors play the year 'round, too. This is an important consideration for any employer accustomed to a high rate of turn-over in his labor supply. Here in Louisiana we provide fishing and hunting grounds for the poor as well as the rich. With the shorter and shorter working hours of industry it is necessary that we give more thought to the leisure hours of the worker—what will keep him contented in his environment. Our fish and game laws, reinforced by modern practices in our conservation of wildlife, assure for our wage-earners, as well as the sportsman of independent

COMMISSIONER WILLIAM G. RANKIN

means, a most varied and prolific source of fish and game.

Not Just a Theory

"With the preservation of our wild life this is work in which the business man should be interested, for the reason that it provides a more satisfactory background for the enjoyment of life, which of course makes for a more contented people. This is not a theory or Utopian dream, for the business man is certainly confronted by the problem of labor supply, which is becoming acute in the congested industrial areas of the North and East—where to move next is not a question of tomorrow, but of today. Hunting and fishing grounds, wild life, recreation parks—these constitute a very real investment in the future happiness of our people, the majority of whom are workers in the plants of industry.

Expanding Industry

"But let us get on with our story. We now have on top of us a comparatively new industry—new in the sense that it is swiftly expanding in every direction, reaching out, exploring, bringing in.

"It does not seem to me sufficient that we should merely regulate this industry, to prevent the waste of this God-given resource through dissipation and over-production, to conserve it for the benefit of future generations. It is an asset that we should capitalize and employ for the benefit of our own generation. I am speaking of our oil, natural gas and carbon black industry, whose products may total a value of $125,000,000 during this year 1937, probably twice the value of our forest products.

"Here is an industry of such volume and such potentialities that it should be employed to generate the driving energy of a new era in the history of our state—it should be the magnet to attract the entrepeneur, the investor, the capitalist, from every direction.

"New Orleans should be the center of this industry, the main-spring of the movement that is so rapidly extending throughout the coastal region. With its combination of rail, water and terminal facilities, its public belt railroad and industrial canal, it offers the ideal location for factories, assembly plants and supply houses. These advantages are already recognized by the refining department of the industry.

"Besides our salt and sulphur mines, with which you are probably familiar, we are continually bringing to light hidden treasures of the mineral, vegetable and animal kingdoms.

Fuller's Earth

"I am just thinking of the huge deposit of Fuller's earth which was recently discovered near Bogalusa—for cosmetics and cleansing purposes it is indeed a treasure that may contribute materially to milady's happiness, to say nothing of the net profits of enterprising manufacturers.

"We have all of these natural resources, these natural advantages, but without man's vision and enterprise and industry they are practically valueless. We have here at our doors the opportunity to create a new industrial empire, to create new sources of wealth through investment and industry, to increase the per capita buying power of our people and elevate their standards of living.

Impressionistic Picture

"Mr. Smith, I hope I have succeeded in giving you an impressionistic picture of Louisiana's natural resources, as I see them.

"As a business man you will be able to get a closer view and fill in the details from authentic sources.

"I wish to add that the State of Louisiana grants a ten-year exemption from taxation to new industries. This is really a virgin field for enterprise and investment—its surface has barely been scratched by industry. Nowhere else in the world today will you find such a store-house of natural resources as the raw material for your fabrication, combined with man-made distribution facilities. Surely enough to fire the imagination and inspire the initiative of the most cautious business man."

Live oak grove, St. Francisville, La.

Forest Fire Fighting and Reforestation

That the reforestry program of the Department of Conservation is an important factor in the industrial development of Louisiana is indicated in the annual report of V. H. Sonderegger, state forester and director of the Division of Forestry, who calls attention to the fact that Louisiana is growing timber much faster than it is being cut.

Louisiana is now growing two billion, one hundred million feet of timber per year, and cutting an average of one billion feet.

Mr. Sonderegger says that with adequate fire protection and proper cutting supervision the forests of Louisiana will furnish a permanent supply of forest products. Industrial activity may be increased through saw-mills, pulp-mills, creosote plants and other forest products operations.

Forest fires were prevalent throughout Louisiana in 1936, which had two abnormally dry periods, Mr. Sonderegger reports. Most of these fires were incendiary. Many fires are started through ignorance, many through indifference. There is a widespread misapprehension that fires will create new grass and get rid of snakes, ticks and other vermin of forest areas; and for this reason the woods are often deliberately set on fire.

Incendiaries

The Department of Conservation has continued its campaign of educational work, emphasizing the fallacy of burning over woods to eliminate or remove objectionable insects. In addition the incendiaries are being prosecuted wherever it is established that such fires were started with malicious intent to destroy property.

With the system of fire towers and telephone lines forest areas are patrolled, fires easily located and the employes respond promptly to calls. It is shown that the average loss for 1936 was 34.7 acres, which is very low. Only 2.2 per cent of the protection area was burned over. and on the greater portion of this burned over land only a partial loss was sustained.

The total number of fires for the year was 3,808, of which the Department of Conservation employees extinguished 2,986, the Civilian Conservation Corps boys 695.

More time is being devoted to the apprehension of incendiaries in 1937. An intensive educational campaign will be conducted throughout the forested area.

The Succulent Oyster Travels Inland

Science proceeds at a swifter pace to meet the needs and desires of our modern civilization.

Faster motors, smoother highways, better refrigeration—and the Louisiana oyster, one of the world's most delectable sea-foods, appears unspoiled in the inland restaurant, 500 miles from its native bed.

New Orleans, because of its accessibility to the sources of supply, has long been famous for its sea-food, the culinary art of her chefs having contributed to the seductive qualities of fish, oysters and shrimp from nearby waters.

Several years ago James N. McConnell, in charge of the Oyster Division of the Louisiana Department of Conservation, having observed the lack of special sea-food restaurants in the interior of Louisiana and her sister states, contacted a number of fishermen with the idea that they open an oyster shop or restaurant in any one of the larger inland cities and place in service one or more refrigerator trucks, as the trade might warrant, hauling oysters and other sea-foods direct from the Louisiana coast.

Mr. McConnell reports that at the beginning of the past season a fisherman who had leased and cultivated oyster bottoms in Plaquemines Parish for the past thirty years, obtained a location in Shreveport and opened an oyster shop and restaurant exclusively for Louisiana sea-foods. With limited capital the man started in a small way, using only one truck; but in one short season his place has become widely known in that vicinity and many times has had to turn customers away because of lack of accommodations. He reports that when passing through Alexandria and other cities on the way to Shreveport he could have disposed of his entire load of sea-food.

Mr. McConnell adds that this man is now making arrangements for more trucks to use in this business next season—quick to realize the possibilities of his new business, he is moving into a new building with three times the capacity of his present location. He had the foresight to engage a chef who is serving special sea-food dishes which were formerly to be obtained only in New Orleans.

"We believe the possibilities of this type of business are unlimited," said Mr. McConnell. "Within the next few years oyster shops and sea-food restaurants of this type will be located in all cities within a radius of 600 miles of New Orleans, of 15,000 or more inhabitants."

So far as oysters are concerned Louisiana certainly offers possibilities for production that are not equalled by any other section of the country—an oyster that is recognized as the best in the world. The Department of Conservation might well hang out a sign reading:

For Rent—More than 60,000 acres of natural reef covered with oysters of various age and size, which can be leased from the state for the nominal sum of $1.00 per acre annually. In addition to the natural reefs there are approximately 500,000 acres of ideal oyster bottoms available for oyster culture in Louisiana.

Not a fish trap, but a "Christmas tree"—a new oil well on the Louisiana coast.

Benefits of Fresh Water

A glance at the configuration of the Louisiana coast line with its innumerable shallow bays and inlets, so far removed from centers of population as to make them immune to sewage pollution, will convince the experienced fisherman that there are no oyster grounds elsewhere in America comparable to those of this state. Add to this picture the fresh water coming down the Mississippi and Atchafalaya rivers, carrying to the oysters billions of fresh water diatoms, an important element in their food supply. The mixture of fresh and salt water is essential for oyster propagation, as the young "spat" does not catch except where this mixture occurs.

Fresh water from these rivers also kills the oyster drill or "conch," the principal enemy of the oyster in Southern waters. The "conch" cannot live except in fresh water and is killed quickly when subjected to brackish water. It is almost impossible to find live oysters, due to the depredations of this shell fish, when there has been a lack of fresh water for two years or more.

Owing to the influx of fresh water from the Bonnet Carre Spillway a bumper crop of steam stock oysters may be anticipated in the Mississippi and Chandeleur Sounds. Large areas of natural reefs in Cat Island Channel and Cabbage Reef, where all of the oysters had been exterminated by the conch, will be rehabilitated, as flood waters killed all of the conches in this territory. These areas furnish a good grade of steam and seed stock, and by April, 1938,

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THE RE-BIRTH OF INDUSTRY

Twenty-five years ago the Louisiana lumber industry was in despair. Forests were being denuded at such a rate that the future of the industry appeared hopeless—in a very few years there would be nothing left to cut.

This was the period of indifference—then came the conservationists, with their vision of re-forestration and forest fire-protection. Twenty years have elapsed and we now enter the third period, a realization of the dreams of the conservationists, the renaissance of industry—a period of constructive industry.

Timber is now being produced in Louisiana faster than it is cut—twice as fast. Reforestation and fire-protection have combined to assure a lumber supply for many years to come.

Manufacturers and others whose industry is dependent on lumber as a basic raw material are invited to investigate the development that is now taking place in Louisiana, as if Aladdin had rubbed his magic lamp and presto ! new forests for old, new materials for enterprise and industry.

Detailed information relating to the timber supply and other resources of Louisiana may be obtained from Gov. Richard W. Leche or by writing to—

DEPARTMENT OF CONSERVATION

126 NEW COURTHOUSE BLDG.,

New Orleans, Louisiana

A typical stand of long leaf yellow pine.

Loading Southern pine logs in the woods.

Louisiana Lumber Industry

By

H. C. BERCKES

Secretary-Manager, Southern Pine Association

Louisiana's lumber industry for several decades has occupied a place of outstanding importance in the business, industrial and community life of the state. Since the early years of its existence, the Southern Pine Association, the trade organization of yellow pine manufacturers, has maintained a forestry committee which devoted much time and attention to study of practical conservation, and of forestry management methods and practices.

Early in the 1920's the Southern Pine Association went on record in support of all practicable and reasonable measures for forest conservation and reforestation, being the first organized group of lumber manufacturers in the United States to take such action. When the late Lumber Code was adopted under the NRA, the Southern Pine Association and its affiliated manufacturers took forward steps in forest conservation by establishing a conservation department with a trained forester as a regular member of its staff. After the Lumber Code and the NRA were abandoned, the Association, by definite action, continued to maintain its conservation department, and notable progress has been made among Southern pine producers in forest management, fire protection, selective cutting and other measures designed to assure perpetuation of the forest resources and the lumber industry of Louisiana and other Southern states.

Pioneer

Much had been accomplished toward forest conservation by the Southern pine industry in Louisiana through years of voluntary efforts on the part of the state's lumber manufacturers and timber owners in cooperation with the Department of Conservation. Louisiana is acclaimed the pioneer among the Southern states in forest conservation and reforestation. Hence it may be observed that Louisiana's lumber industry has maintained close relations with conservation during a long period of years.

Southern pine mill village.

There is abundant reason for the dominating position that lumber has maintained among Louisiana's manufacturing industries. In Louisiana, as in all other Southern states, the lumber manufacturers have founded and sustained many enterprising, prosperous communities, providing not only the means of livelihood for practically all the employable inhabitants, but also the facilities for the education, recreation and social, cultural and spiritual welfare of the people in the community. In numerous other communities in the state the lumber industry has been one of the main sustaining factors, contributing importantly to the general welfare of the people. And it is highly gratifying to both the lumber manufacturers and to the people of the state, to have the assurance available today from many sources and developments, that Louisiana's lumber industry is not a decadent one, but is

View of a Southern pine sawmill with filled log-pond in foreground.

established on a permanent basis and will continue an important factor in the business, industrial and community life of the state for all time to come.

Nature has blessed Louisiana with some of the highest type commercial forests in the world. This state produces some of the finest quality of longleaf and shortleaf yellow pine, cypress and hardwoods of numerous useful species, that are available anywhere on the globe. Louisiana has some of the largest and best equipped sawmills in the world; many of her manufacturers are leaders in the lumber industry of the nation and have the well-earned reputation of being among the most efficient producers of lumber that can be found anywhere that this material is manufactured for the service of mankind.

Cypress

Lumbering has been one of Louisiana's most important industries for a great many years. Manufacture of cypress on a commercial basis began in the state shortly after New Orleans was founded as the headquarters of the early French colony. Yellow pine was being produced commercially in the state some time before the War Between the States and pine sawmills were operating in Northwest and Southwest Louisiana in 1868, or even earlier. Production of hardwoods in Louisiana along the Mississippi river was in progress in the early part of the 19th century. After the large railroad systems completed their lines through the state in 1880 to 1882, the lumber manufacturing industry of Louisiana steadily increased in importance and Louisiana lumber of many species has been accorded a place of favor with all classes of consumers in this and other countries for many decades.

76 Billion Feet

From about 1880 through 1935 a total of about 76 billion feet of lumber have been produced in Louisiana. The cut for 1935 was over a billion feet with a value of more than 26 million dollars. Some idea of the economic importance of the lumber industry to Louisiana is shown in the U. S. Census Bureau figures for 1929, which is regarded as a normal year. In 1929 Louisiana's lumber industry gave employment to 35,456 persons, or 36 per cent of all persons employed in all the manufacturing industries of the state; lumber paid $32,799,477 in salaries and wages in 1929, or 30% of the total salaries and wages paid by all manufacturing industries, and the value of Louisiana's lumber products in 1929 aggregated $94,931,572, or 14% of the value of all the state's manufactured products. In addition lumber's allied forest industry—wood pulp and paper—in 1929 employed 1,282 persons, paid $1,898,975 in salaries and wages, and its products amounted to more than 18 million dollars in value. While exact figures are not available, it is known that Louisiana's lumber industry pays several million dollars annually in state and community taxes.

Yellow Pine

For some years Louisiana led all the states of the Union in production of softwoods, with her output of Southern yellow pine, and to the present day this state's yellow pine cut places Louisiana among the leaders in softwood production. In addition, Louisiana for a decade or more has led all states in production of hardwoods. Louisiana for many years has been at the forefront in conservation, forest management and intelligent utilization of forest resources, many of her lumber manufacturers practicing selective cutting, management of timberlands for sustained yield and fire protection.

The following tabulation, made in 1930 by the U. S. Forest Service for the Copeland Report, shows the condition of Louisiana's forests:

COMMERCIAL FOREST AREAS OF LOUISIANA

	Acres
Old growth........	1,219,000
Second growth saw-timber	6,164,000
Second growth cordwood	2,459,000
Re-stocking	6,221,000
Deforested	1,840,000
Total	17,903,000

From the same source it is learned there are more than 28½ billion board feet of merchantable sawtimber now standing in Louisiana.

The total land area of Louisiana is 29,061,760 acres, so that according to the Copeland Report figures, approximately 62 per cent of the state's total land area is forest land, of which 38.5% is pine forest land. A report of the Division of Forestry, Louisiana Department of Conservation, gives a total of 19,200,000 acres of forest land in the state, and of this 6,200,000 acres are under intensive protection against fire.

This source places the area of forest land in the state somewhat larger than the Copeland Report with corresponding larger percentage of forest land in proportion to the total land area. Even on the Louisiana farms timber is important. The total farm area in Louisiana is 10,444,000 acres and woodland, according to the Census data for 1935, occupied 3,427,000 acres, or one-third of the farm area. Cash income to farmers from their timber amounted to nearly a million dollars in 1934 and undoubtedly is greater now. Timber in that year ranked fourth in importance as a source of farm income in Louisiana.

It is a matter of common knowledge, supported by scientific studies, that timber has an exceedingly rapid rate of growth in Louisiana owing to climate, soil, moisture and rapidly growing tree species, and with further development of fire protection, and forest management now underway vigorously in the state, there can be no doubt that the lumber industry in Louisiana is destined to be permanent. This is further supported by the fact that such a large area of the state's forest lands is in second-growth sawtimber and cordwood, indicating that as the old timber matures and is cut, it is rapidly replaced by the young timber.

Consumption

Figures on distribution of Louisiana's lumber output for 1928 show that the state produced 2,278,422,000 feet of lumber and consumed 707,880,000 feet, the figures showing that the products of Louisiana's lumber industry find their way into the lumber consuming markets throughout the United States and all civilized foreign lands. Numerous comfortable homes throughout the nation have been built of Louisiana lumber, as well as a great many other buildings, railroad and highway structures, farm machinery, furniture, automobile bodies, and numerous other articles in which lumber is used. Thus in addition to the employment given and wages paid in the Louisiana lumber manufacturing industry itself, the state's lumber industry has indirectly provided work for thousands of carpenters, artisans, craftsmen and transportation employees, and millions of dollars in wages throughout the country. The wealth brought into the state from the outside from the sale of products of Louisiana's lumber industry aggregates an enormous total each year.

Sawmills and logging operations are numerous throughout the entire forested portion of the state and employees and their families are comfortably housed and receive the best of medical attention, have excellent school facilities, and other advantages enjoyed by Louisiana citizens.

Second Growth

Both virgin timber and second-growth are available in large quantities in Louisiana. Second-growth developed rapidly when virgin timber was removed, except in areas where fires and hogs destroyed the young trees. Even such areas are limited, and only 10 per cent of the forest area of Louisiana is classed as deforested. Forty-one per cent of the state's forest area is in second-growth and virgin timber large enough to be merchantable for sawtimber, while 14 per cent is cordwood size that will soon grow to saw-timber and 35 per cent is restocking satisfactorily to young growth.

Members of the lumber industry of Louisiana are making every effort possible to maintain the industry permanently by cooperating with the state in fire protection, practicing selective cutting, and by following approved forestry methods of timber growing. Reforestation by planting has been carried on for a number of years by two large lumber companies that pioneered in artificial reforestation, and tree-planting methods for Southern pines are based on the discoveries of these companies. During the last year at least two new sawmills, cutting yellow pine lumber, began operations on areas the owners previously had cut over. These companies had retained ownership of their cut-over land in the hope that some day they would find it possible to enter sawmilling again on the tracts. Their hopes are realized much sooner than they expected and it is their plan to cut selectively, buy logs from other forest owners, including farmers, and operate perpetually. Other mills are taking the necessary steps to continue operations without cutting out.

Permanence

For some years the erroneous thought that the lumber industry of Louisiana and other Southern states

Interior of a Southern pine sawmill.

Southern pine lumber being put through dry kilns.

was impermanent plagued the steps of the lumbermen. But study and experience have dissipated this erroneous idea. Permanence in the lumber industry of this and other Southern states is of a three-fold nature. It lies not only in our timber supplies, but also in our institutions and our markets. By institutions we mean not only our associations, but our producing facilities as well. Institutions and markets cannot be maintained without timber supplies and timber supplies are useless without institutions and markets.

Under the late Lumber Code our industry assumed certain obligations with respect to forestry and conservation. With the passing of the Code the Southern Pine Association continued its forest conservation department, which has justified its existence if for no other reason than that it has proved the permanence of our supply of Southern pine. The staff of the Association's conservation department has conducted extensive and intensive investigations of the timber holdings, logging and plant operations of lumber manufacturers in Louisiana and other Southern states. They found that the producers are practicing selective cutting, forest management, fire protection, and other practical forest conservation measures. They have found the rapid growth of Southern pine trees to merchantable saw-log size has been beyond all predictions and that the second-growth timber which has followed virgin timber is the basis for the permanence of Southern pine.

"Timber Famine"

They have found old fears of "timber famine" erroneous and that Southern pine lumber is a staple commodity and always will be available. It is admitted that some mills will close operations and that others temporarily will reduce their output, but the great majority will continue in business at the old stand for a great many years, if not permanently. As their timber growth increases with better fire protection, selective cutting and forest management, their operations will expand.

Sawmills

Permanent sawmills can attract other wood-using industries to their localities and hence promote industrial development and local markets for lumber and at the same time find a profitable outlet for forest by-products. The rapid expansion of the kraft paper industry in the South and probability that the white and newsprint industry also soon will come South is of tremendous importance to the lumber industry of Louisiana and other Southern states. Both the lumber and the paper industries are forest products industries of the first magnitude, both require large quantities of timber. Because the paper industry can use small-sized trees, and in the case of the newsprint industry, requires them, while the lumber industry needs saw-logs, there is no reason for competition between them for timber supplies. But the coordination of the forest products industries is essential, whereby, for example, thinnings from the lumbermen's forests go to the pulp paper mills while the lumbermen obtain the saw-timber which the pulp paper mill forests will grow.

Young forest of Southern pine.

U. S. Survey

Statements concerning the permanency of the lumber industry of Louisiana and of the South in general, are further supported by the results of the survey made by the U. S. Forest Service, which in the South is under the direction of Capt. I. F. Eldredge. In a recent address on the "Pulpwood Resources of the South" he sets forth the tremendous quantity of timber in all the Southern states that has been revealed by the survey and which either now is available or later on will become available for the pulp paper or the lumber industries. Captain Eldredge, however, recommends a plan of integrated utilization of forests resources by the paper and lumber industries and the handling of the timber lands on a sustained yield basis. The figures produced by the survey convincingly set at rest any fears that might have existed as to any "timber famine" in the South.

The state of Louisiana and her lumber manufacturers are fully aware of the importance of the lumber industry to the welfare of the people of the state, and are bending every effort to perpetuate the state's forest resources and the great lumber industry. Virtually all the lumber companies cooperate actively with the efficient forestry division maintained by Louisiana for the protection of forest lands against fire and for promoting forestry in general. The lumbermen pay half the cost of fire protection.

Industry thrives only when there is a favorable economic environment. Louisiana's lumber industry has a favorable physical environment for permanence due to the rapid growth and development of good timber. A favorable economic environment can be brought about by public cooperation with the industry in solving its problems.

It is not easy for lumber manufacturers by themselves to overcome the obstacles to permanence of their industry. The large areas that a company must maintain in a productive condition notwithstanding fires and trespass means a very considerable cost each year. In addition to these costs, annual taxes must be paid, and unless state and local taxing authorities are sympathetic toward permanent forest industries, taxes frequently are unreasonably high, thus compelling forest owners to cut out their timber as rapidly as possible. The margin of return above the cost of growing timber is so narrow that even a few cents an acre, one way or the other, in taxes may mean the difference between a successful timber-growing project and a bankrupt enterprise.

That the forest tax problem in Louisiana is in need of serious consideration is indicated in a report of the Southern Forest Experiment Station, which shows that in 1934, 3,441,860 acres of rural land had been adjudicated to the state for non-payment of taxes. This area is 11.9 per cent of the gross land area of the state. The forest tax law of Louisiana is a helpful step towards more equitable forest taxation, but for its successful application local taxing authorities must be sympathetic toward its aims and objectives.

Louisiana lumber manufacturers have largely passed the stage of harvesting over-ripe virgin forests, and are well within the everlasting cycle of adapting to public needs rotating crops of trees. Since this is true we must preserve to the greatest possible extent for private enterprise, fee ownership of our prolifically reproducing forest lands. In general Louisiana lumber manufacturers are utilizing and managing their timber so that they may maintain permanent lumber operations, and probably increase their present production in the future; so that the communities where they operate may continue to prosper and their inhabitants continue to find employment, comfort and happiness for themselves and families; and so that the important lumber industry of Louisiana may be a permanent factor in the state's industrial life and possibly develop to greater proportions than in the past.

Mississippi River Bottoms Hardwood Study

By V. H. SONDEREGGER
Forester and Director, Division of Forestry

The Bonnet Carre Spillway, located 27 miles above New Orleans near LaPlace, Louisiana, contains 7,806 acres of land. The width of the Spillway at the Mississippi River is 7,725 feet, and at the Lake Pontchartrain end is 12,650 feet. The total length of the levee from the Mississippi River to Lake Pontchartrain is 31,365 feet, and the guide levees on both sides vary in height from 22 feet to 7 feet at the lower extremity.

The Department of Conservation is very much interested in the results of the recent high water which went through the Bonnet Carre Spillway, which, in the majority, contains a large acreage of various second-growth hardwoods and cypress. Studies will be made to determine just what benefits and what damages were caused by the overflow waters in the forested area of the Bonnet Carre Spillway. This work has just been started, and the Direc-

(Turn to Page 22)

Bonnet Carre Spillway—From middle of bridge on Air Line Highway, looking towards river. Current at this point was very swift.

Same location after closing of Spillway. Some of the trees have been recently cut.

This interesting description of the Mathieson Alkali Works, at Lake Charles, illustrates in a graphic manner the ideal combination of capital, management and vision, when brought into juxtaposition with the natural resources and facilities for distribution that Louisiana is offering industry today.

A few years ago, nearly all caustic soda was shipped in the solid form, packed in steel drums. Mathieson has been a pioneer in the distribution of liquid caustic in tank cars with a consequent saving of thousands of dollars to consumers. Here a tank car is being loaded with liquid caustic at the Lake Charles plant.

Oyster shells from the dead beds in Calcasieu Bay and nearby Gulf beds are available literally by the billions of tons for the lime supply of the Mathieson plant. Here is shown a portion of the shell storage at the plant.

Chemistry and Conservation

Mathieson Alkali Works Sets Example in Utilization of Louisiana Resources.

The occasional cynic who holds man an essentially self-seeking creature lays himself open to an interesting line of attack. For why, if this contention is true, do we see modern society turning its eyes more and more toward the future? Why is our concern for the welfare of our children's children rapidly mounting? Why, if man's motives are primarily selfish, do his governments pass laws, set up commissions and spend great sums to conserve the world's resources for the benefit of some far off generation? Why, indeed, Mr. Cynic?

In recent years, the tendency to look upon nature's gifts as the rightful endowments of future as well as present generations has grown by leaps and bounds. In this same relatively brief span, chemistry has made its most amazing progress. In one sense, this progress has helped to provide a solution to the problem of conserving natural resources. In another it has made the problem more complex. Successful chemical research is continually finding new ways to duplicate nature's processes and new products to take the place of nature's raw materials. Sometimes, however, chemistry evolves new products of great usefulness which require raw materials of which there is but a limited supply. Then the problem becomes more complex. The chemist must either find a new way to make his product from other raw materials or discover a substitute for it. The story of the interesting relationship between chemistry and the conservation of natural resources would fill many pages. So let us here just follow the relatively simple story of an everyday material—glass.

Just Imagine !

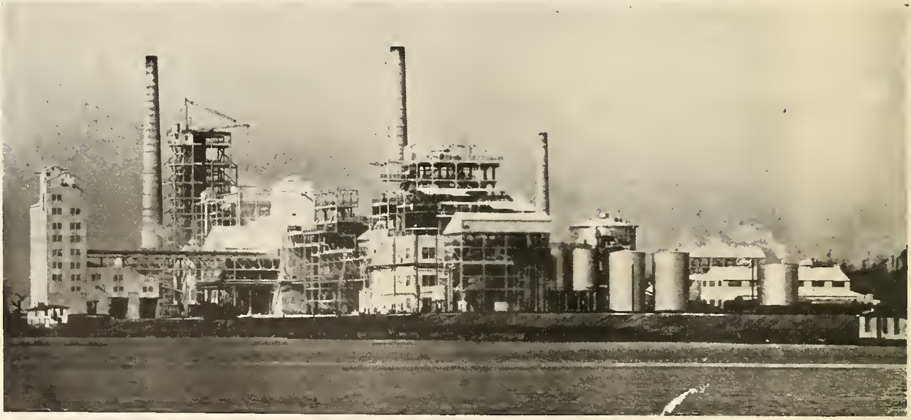
Before the discovery of glass, parchment was the only material of which primitive windows could be made. Parchment was made from the hides of animals by a slow, hand process. If we were to have to depend now upon parchment for our windows, it would probably take the whole state of Texas to raise enough cattle to provide windows just for the city of New Orleans. And you can imagine what life would be like with opaque parchment windows, what it would be like to have to get along without the thousand and one things, including electric light bulbs, which glass makes possible.

Although the discovery of glass forestalled our need for one type of natural resource it created a demand for others. Instead of pasture lands, we require great quantities of sand, limestone and soda ash, the materials of which glass is made. It is probably safe to say that the earth's crust contains enough of the first two materials to far outlast any conceivable need. But what of the third? Soda ash, as we shall later see, is made from salt, limestone and some sort of fuel. Even if the salt deposits known today—and they are sufficient to last some thousand years at our present rate of consumption—should prove to be the only salt deposits on the earth, there would still be the briny ocean to make the glassware and flavor the chops for doomsday dinner. As for fuel, there have been numerous predictions of what our descendants will do when the supplies of coal, oil and natural gas known today are exhausted. Some say the energy of the sun will be harnessed. Others say science will unleash the tremendous potential power locked up in the atom. Still others predict we will simply discover new mines and new wells. But suffice it to say that human ingenuity will find new ways to draw upon nature's unending storehouse of energy long before the need for them arises.

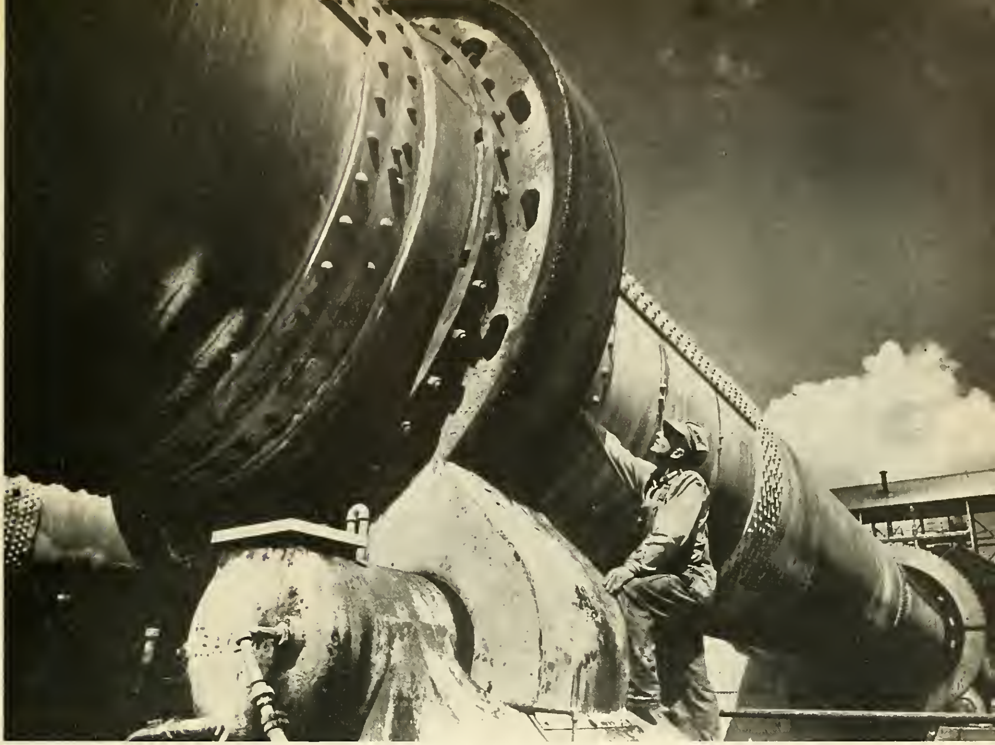
Chemical Research

Glass, of course, is not a new example of the power of chemistry to alter our requirements of nature. But it is an interesting one in that it shows chemistry substituting a material with unlimited future for one which would have been quickly exhausted by the rapidly growing demands of civilization. While it is true that there is still much room for chemistry to find similar substitutions, a glance at the list of developments of the past ten years reassures us that chemical research will keep pace with our needs. Synthetic resins, artificial silk, commercial aluminum (the most abundant metal on the surface of the earth), synthetic rubber and other discoveries too numerous to mention bear witness to the ability of chemistry to help solve many of our conservation problems.

Chemistry, however, cannot do the whole job alone. Society will have to continue to pay close attention to the conservation of its natural resources; will have to keep on study-



The towers, stacks and steel-work of the Lake Charles plant, confusing as they appear to laymen, impress production engineers by their advanced design, integrated operating facilities, and unique arrangements that reduce handling costs. Many refinements that help to insure products of exceptional uniformity and purity are also incorporated in this modern plant.



One of the large lime kilns at the Mathieson plant. It is in these kilns that the oyster shells are burned to produce lime and carbon dioxide gas.

ing, regulating and spending money to help industry and agriculture assure future generations of their rightful heritage.

Alkali at Lake Charles

Let us leave the subject of conservation and go over to Lake Charles to see how Louisiana's resources are used in producing one of industry's most important raw materials—alkali.

It was along in the early twenties that The Mathieson Alkali Works, a Virginia corporation which had been operating large plants at Saltville, Va., and Niagara Falls, N. Y., since 1895, decided to look for a suitable location for an alkali plant in the rapidly explaining Southwest. Proximity to the necessary raw materials, naturally, was the first essential of the location they sought. But of almost equal importance was the requirement that the location should provide low-cost transportation to the maximum number of alkali consuming centers. In 1930, after a careful survey of a number of points in Louisiana and Texas, Lake Charles was selected as the location providing the ideal combination of facilities.

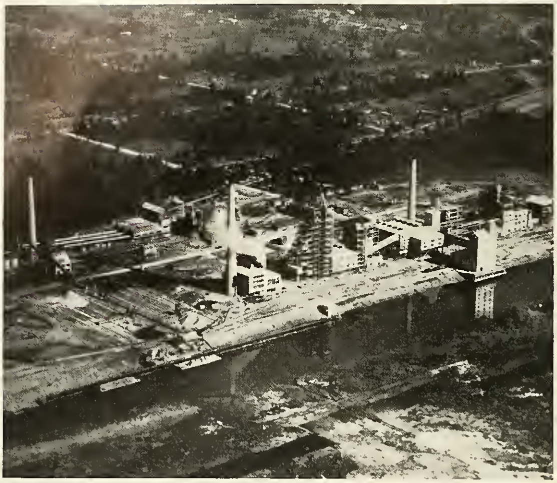
Salt for Mathieson's Lake Charles operations is secured from their West Hackberry Salt Dome, some 12 or 15 miles southwest of the city. The salt is dissolved in water and the resulting brine is pumped by pipe-line to the plant. It is interesting to note that Mathieson's salt supply is probably the purest of any ammonia-soda plant in the world; the supply is practically unlimited.

"Four other oysters followed them,
And yet another four
And thick and fast, they came at last
And more and more and more—"

Lewis Carroll might well have been thinking of Mathieson when he wrote these entertaining lines. For the source of the enormous quantities of lime required for the Lake Charles plant is oyster shells, dredged from the bottom of Calcasieu Lake. The shells are delivered by barges from which they are unloaded by grab-bucket and dropped into a hopper. The shells go through an enormous washer where mud and other foreign matter are removed before they go to the kilns to be converted to lime or to storage. No other alkali plant has a purer, or more economical source of lime than the Mathieson plant at Lake Charles. And Mother Nature supplies the oysters a lot faster then Mathieson and a whole regiment of Walruses and carpenters could possibly use them up. As a matter of fact, the beds from which Mathieson takes its shells are not live beds.

Fuel From Natural Gas

From the time the Lake Charles operations were begun in the latter part of December, 1934, until June of last year, the plant operated on fuel oil secured from nearby Louisiana fields. Last June, however, arrangements were completed and the plant was switched over to natural



The location of the Lake Charles plant at tidewater is a factor of actual dollars-and-cents value to alkali consumers over a wide area. At the plant docks, water shipments are loaded on steamers serving ports on the Atlantic and Pacific coasts. Barges loaded at the plant make their way to points along the Intracoastal Canal and throughout the Mississippi River basin.

gas as originally planned. The gas is piped only some 40 miles from the Tepatate Field in central Louisiana, so that the Mathieson plant has extremely low fuel costs.

Salt, lime and fuel are the raw materials from which soda ash and caustic soda are made. Both the raw materials and finished products are simple, well-known articles. But the chemistry involved in this transmutation of matter is highly complex when all its ramifications are considered. Technically, the process which Mathieson employs in its Lake Charles operations is known as the "ammonia-soda" process. The brine solution coming from the salt wells is first carefully purified, and then saturated with pure ammonia gas. The ammoniated brine flows down through the carbonating towers where it mixes with carbon dioxide gas. In the towers, a chemical reaction takes places, the products of which are bicarbonate of soda and ammonium chloride. The ammonium chloride liquor is filtered off and piped to the recovery plant where the ammonia is separated by distillation with lime derived from the oyster shells so that it may be used over again for treating the brine. The sodium bicarbonate may be dried and sold as such or it may be put through a calciner and converted to soda ash (sodium carbonate). The carbon dioxide for the process is derived from the kilns where oyster shells are burned to produce lime and the carbon dioxide gas. The lime is also used to convert a portion of the soda ash output into caustic soda.

Ammonia-Soda Process

For those of us who are not too far removed from our high school chemistry, the ammonia-soda process seems simple enough. And in principle it is. Where the high engineering skill and the technological experience is required, however, is in the operation of the process on a large scale, in securing maximum yields of saleable material, in establishing controls which constantly maintain the purity of the finished products, in efficient recovery of ammonia, in utilizing by-products to their best advantage and in a hundred other matters which determine the success of the process. The new Mathieson plant at Lake Charles is in itself a high tribute to the skill of this company's engineers and to the technical excellence of its chemists. For the new plant represents the most modern in alkali plant construction; its advanced design, integrated operating facilities and unusual arrangements that reduce handling costs immediately impress production engineers. And chemists in customer's plants are quick to appreciate the many refinements which were incorporated in the design of this plant to help insure products of exceptional purity and uniformity.

Alkalis in Industry

Hardly a person living in civilized America can look about his surroundings without seeing something which is dependent for its very existence upon alkali. The two principal products of the Lake Charles plant—soda ash and caustic soda—are the most important alkalis; they enter our everyday existence in a wide variety of ways.

Glass Manufacture uses nearly half the country's total output of soda ash. For every hundred pounds of glass made, roughly twenty-five pounds of ash are required. Another large consumer of soda ash is the soap industry, where alkali is one of the two principal raw materials. Soap is a chemical combination of alkali and a fat or oil; the reaction which takes place is known as saponification. What part the reduction in the cost of soap—made possible, in part, by development of alkali manufacture—has played in civilizing mankind is anybody's guess. But it is safe to say that the part has been an important one.

A close second to the soap industry in the consumption of soda ash is the chemical industry itself. Here large quantities are used in the manufacture of water glass, tri-sodium phosphate, dye-stuffs and numerous other chemicals. A substantial proportion of soda ash also goes into the making of modified sodas—mixtures of alkalis, sold for commercial laundry, industrial and home use as cleaning agents.

The pulp and paper, textile and petroleum industries are other important soda ash customers, with water softening and miscellaneous uses accounting for the remainder of the soda ash output.

Caustic soda also finds extensive use in the manufacture of soap where it is employed to saponify the fats or oils. Of almost equal importance is the petroleum industry which uses thousands of tons of caustic soda in its refining operations.

But the largest, and certainly the most significant, use of caustic soda is in the manufacture of rayon. For here is an entirely new industry—an industry which has made phenomenal progress during the past few years in spite of a world-wide depression—for which caustic soda is one of the principal raw materials. And the interesting thing about it is that this new industry has made entirely new demands upon the alkali industry for caustic of exceptional purity. With their electrolytic plant at Niagara Falls, N. Y., producing caustic of a purity unequalled by any other manufacturer, the Mathieson Alkali Works was in excellent position to capitalize on these new requirements. Great strides were also made in improving the quality of the ammonia-soda caustic made at Saltville, Va., so that by the time the Lake Charles plant began operations, Saltville was producing caustic which was second only to Mathieson's Niagara Falls product. Advantage of the experience gained at Saltville was taken in designing the new plant at Lake Charles; when the latter plant started up it was producing a caustic which closely approximated the Niagara Falls caustic in purity. Extreme uniformity, another requirement of the rayon manufacturers, is a quality which characterizes the Mathieson Caustic produced at all three plants.

Like soda ash, caustic soda finds a wide variety of uses in the chemical industry. In the synthesis of such organic compounds as indigo, vanillin, phenol, coumarin, etc., caustic soda is frequently an important reagent. It is also widely used in recovering glycerine, purifying oxygen and making many inorganic sodium compounds.

Relatively large quantities of caustic soda find their way into the textile finishing, pulp and paper, rubber reclaiming and vegetable oil refining industries. Household lye also represents an appreciable proportion.

Transportation Facilities at Lake Charles

Located at a virtual hub of transportation facilities, Mathieson's Lake Charles plant can boast a unique position as a shipper of alkali. For one thing, the location of the plant at tidewater means low transportation costs to consumers at many important points. Not only can deep water shipments be loaded at the plant docks on steamers serving ports on the Atlantic and Pacific coasts, but barges loaded there can make their way to points along the Intracoastal Waterway and throughout the entire Mississippi River basin. It is estimated that this great inland water system alone serves an area containing 75% of the industry of the United States.

In the matter of railroad facilities, the location of Lake Charles is again a happy one. The main lines of both the Southern Pacific and the Kansas City Southern pass the front door of the Mathieson plant. The Missouri Pacific also enters Lake Charles and may be reached from the plant with no extra switching charges. This means that the plant is only 44 hours from Kansas City, 40 hours from Tulsa and Oklahoma City, 38 hours from St. Louis and 11 hours from New Orleans.

Not only is Lake Charles ideally situated from the standpoint of distant shipments, but the city itself is located at the heart of the most rapidly expanding industrial section of the United States. The petroleum industry, as we know, is already far advanced. Sixty-five percent of the whole country's output of petroleum products is produced within the territory served by Mathieson's new plant, making the petroleum industry this plant's largest potential consumer. Natural gas production is another large industry centered in this area which represents an important outlet for Mathieson products.

In the glass industry, we also find the South well along with a number of important plants located in Oklahoma, Texas and Louisiana. With the Mathieson plant at Lake Charles providing an economical source of soda ash and with the other necessary raw materials—sand, limestone

Packing and loading facilities at the Mathieson plant are as modern as the manufacturing operations themselves. Shown at the right is the packing and loading building with a freight car in place.

and fuel—nearby there is every reason to believe this area will attract other important glass plants in the very near future.

Although there are as yet no large soap factories in the immediate Lake Charles area, the unique transportation facilities available there put the Mathieson plant within close reach of the enormous soap plants in Kansas City. Here again, however, there seems every likelihood that the Mathieson plant together with the other natural advantages of the section will draw a larger proportion of the soap industry to Louisiana.

Pulp and Paper Industry

From the standpoint of rapid expansion, at least, the pulp and paper industry represents the most interesting development in the South. This industry—one of Mathieson's most important customers—has invested more capital for new plants and for expansion of existing plants in the last three years than any other. And the significant thing about it is that almost without exception these expenditures have been made in the South and Southwest.

The figures published in the December, 1936, issue of *Chemical & Metallurgical Engineering* tell their own eloquent story. At the time this issue was published, a total of $130,700,000 had been appropriated for new plants and modernization and expansion of present plants, all in the South and Southwest. Of this total, "over $60,000,000 was for pulp and paper mills, $13,000,000 for petroleum refineries, nearly $8,000,000 for distilleries, $7,000,000 for rayon plants, approximately $5,000,000 for glass, $3,000,000 for fertilizer, $1,000,000 for sugar refineries, $1,700,000 for cement mills and the remaining millions of dollars for a large number of other process industry plants."

Located in the area served by Mathieson's Lake Charles plant there are, of course, a great many other consumers of alkalis. One of the largest of these is the vegetable oil refining industry. Then, too, there are the insulating board manufacturers, cotton mills, laundries, sugar refineries, plants using alkalis for water treatment, dairy and bottling plants, manufacturers of water softeners and boiler scale removers, oil well contractors, lumber mills, tire manufacturers, storage battery works and any number of plants where caustic is used as a paint and grease remover.

Typical of all the equipment in Mathieson's plant are these settling tanks where clear caustic liquor is separated from precipitated calcium carbonate. This equipment represents the most modern in chemical engineering design.

Other Mathieson Plants

No story of Mathieson's Lake Charles operations would be complete without some reference to their Saltville, Va., and Niagara Falls, N. Y., plants.

For a number of years, the Mathieson plant at historic Saltville was the only alkali plant south of the Mason and Dixon Line. Ever since the plant first began production in the middle of 1895, it has been a pioneer in the efficient manufacture and distribution of alkalis, principally for southern consumers. Today, soda ash, caustic soda, bicarbonate of soda and various fused alkalis such as Purite (used by foundries) and PH Plus (used for water softening) are made at Saltville. An interesting recent development was the construction of a modern dry ice plant which for the past five years has been marketing an exceptionally pure product throughout the South. The company has also become engaged in the marketing of Gypsum products in certain southern states through acquisition of the mines and works at North Holston, Va.

Attracted to Niagara Falls in 1896 by the cheap electric power available there, Mathieson built the first commercial plant in America for the manufacture of chlorine and caustic soda from salt by an electrolytic process. These two products are produced here today in large quantities and shipped to consumers over a wide area. Mathieson's other chlorine products — sulphur chloride, bleaching powder, C C H, H T H, and H T H-15—are also produced at this plant. In addition, large quantities of ammonia are made here "from the air at Niagara."

With a research program geared to the increasingly complex requirements of industry and up-to-date manufacturing facilities at three strategically-located points, Mathieson is equipped to move forward with the leaders of American industry.

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Mississippi River Bottoms Hardwood Study

(Continued from Page 15)

tor of the Southern Forest Experiment Station is cooperating with the Louisiana Division of Forestry.

The photographs which accompany this report are self explanatory. The studies will be based on the information derived from the effects of the floods on the growing timber. The photographs have been furnished by the Southern Forest Experiment Station. The Experiment Station and the Forestry Division will carry on this experiment jointly, as time and funds warrant, and it is believed that valuable information on second growth hardwoods for the lower Mississippi Delta will be obtained.

Field Study Tour of the Lower Mississippi Delta

By JOHN S. KAISER

Chairman, Division of Social Sciences,
La. State Normal College

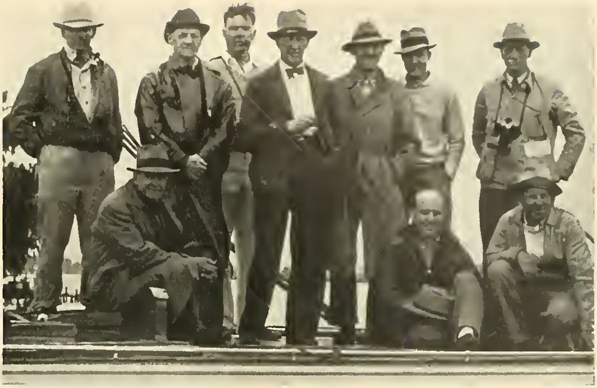

Figure 1. Photograph showing members of the party who made the field trip to the lower Mississippi River delta. Standing left to right: H. V. Howe (Director, School of Geology, Louisiana State University), C. C. Colby (Acting Chairman, Department of Geography, University of Chicago), S. D. Dodge (Department of Geography, University of Michigan), V. C. Finch (Chairman, Department of Geography, University of Wisconsin), R. J. Russell (School of Geology, Louisiana State University), C. K. Moresi (State Geologist, Louisiana Department of Conservation), R. S. Platt (Department of Geography, University of Chicago); seated left to right: D. S. Whittlesey (Department of Geography, Harvard University), G. D. Hudson (Geographer, Tennessee Valley Authority), and F. B. Kniffen (School of Geology, Louisiana State University). John S. Kyser (Chairman, Division of Social Science), Louisiana State Normal College) who also made the trip but is not in this group picture.

On March 23 to 26, the State of Louisiana, through the courtesy of the Department of Conservation and Commissioner William G. Rankin, was host to The American Geographers. Each Spring, the members[1] of this association assemble at some designated point for the purpose of conducting a field study of an area which is deemed to have especial significance for students of American geography. This year, Dr. R. J. Russell, Professor of Physical Geography, and Dr. F. B. Kniffen, Professor of Cultural Geography and Anthropology at Louisiana State University, induced the association members to come to Louisiana and make a reconnaissance of the lower delta of the Mississippi[2]. The trip was made by boat and enabled the visitors to see portions of Orleans, St. Bernard, Plaquemines, and Jefferson parishes in a way that is denied to all but a fortunate few.

Figure 2. Group seated on top of the Department of Conservation boat "Louisiana" viewing cultural developments along the New Basin Canal. This photograph was taken as the boat departed from the Department's wharf in the New Basin Canal.

A sunny morning provided an auspicious start from the Department's base on the New Basin Canal (Figure 2), and the pleasant weather continued throughout the greater part of the trip. Soon the boats[3] reached Lake Pontchartrain whose slightly muddy water was a reminder of the recent successful operation of the Bonnet Carre spillway. As the boats coasted eastward, the sturdy seawall gave further testimony of the great strides that have been made in permanent flood control. These sights, when attuned to the consumption of fresh oysters—opened by the consumer himself (Figure 3)—supplied just a part of the proof that Louisiana really has cause to "count her blessings".

The boats passed through Chef Menteur and Lake Borgne from which the route led up Bayou St.

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[1] Other than the men mentioned in this paragraph, the association members who made the trip were as follows: C. C. Colby, Acting Chairman of the Department of Geography, the University of Chicago, S. D. Dodge, Department of Geography, the University of Michigan, V. C. Finch, Chairman of the Department of Geography, the University of Wisconsin, G. D. Hudson, Geographer, Tennessee Valley Authority, R. S. Platt, Department of Geography, the University of Chicago, D. S. Whittlesey, Associate Professor of Geography, Harvard University, and editor of the Annals of The American Geographers. Guests were: H. V. Howe, Director, School of Geology, Louisiana State University, J. S. Kyser, Chairman, Division of Social Sciences, Louisiana State Normal College, C. K. Moresi, State Geologist, Louisiana Geological Survey.

[2] This area has been the object of especial study and the results are embodied in GEOLOGICAL BULLETIN NO. 8, published by the Louisiana Department of Conservation, entitled, LOWER MISSISSIPPI RIVER DELTA, by R. J. Russell, H. V. Howe, J. H. McGuirt, C. F. Dohm, W. Hadley, Jr., F. B. Kniffen, and C. A. Brown.

[3] The "Louisiana" and the "Ferol".

Malo for several miles (Figure 4). By means of a canal, the big bend of Bayou La Loutre was eliminated, although the latter was entered not far from its junction with Bayou Petre. The discussions during this part of the trip ranged from comments on the heavily loaded oyster boats to evidences of reduction and oxidation of sedimentary materials as shown in the cut profile and spoil banks of the canal. From the viewpoint of physical geography, the outstanding interest of this portion of Louisiana is to be found in the story of former Mississippi River distributary action as provided by Bayou La Loutre and associated drainage features. Dr. Russell lead the discussion on the evolution of these features while Dr. Kniffen explained the part played by Indian mounds and camp sites.

Late in the afternoon, the group arrived at a point marked by the junction of Bayou La Loutre and Bayou Petre, and from there a short excursion was made to an abandoned U. S. Coast and Geodetic Survey tower. The platform at the top provided an excellent view of a large section of the drainage pattern. Upon return to the boats, every person was well-prepared for the evening meal, and at the conclusion of a two-hour round-table discussion which followed, the visitors spent their first night in the Louisiana marshlands.

Water Change

By noon of the second day the boats reached the mouth of Main Pass. Long before this point was reached, however, the activity of this distributary was shown by a very pronounced change in the water. From the top of the "Louisiana," the line of contact between the clear water of Breton Sound and that which had come from the distant Mississippi was most striking (Figure 5). A narrow zone of foam and drift wood made a sharp cleavage between the brilliant choppy surface of the former, and the relatively smooth muddy one of the latter. (The accompanying photo may serve to illustrate this; and for a description of Main Pass, see report on the "Lower Mississippi River Delta".)

The bar at the mouth of Main Pass makes this back-door entrance to the Mississippi of value only to boats of very shallow draft at any time, and on this particular date, Captain Sandras took numerous soundings before an entrance could be found for our boats with a maximum draft of about four feet. Once across the bar, and a short distance beyond, there was available a perspective of surpassing interest for students of delta processes. Even though no sediments were above water level, it was possible to detect the definite boundaries of Main Pass channel. Two long lines of ill-sorted drift stumps and logs marked the approximate crests of incipient natural levees, and as the boats moved farther toward the Mississippi, these rather chimerical bits of evidence gave way to something more definite: first, the shreds of marsh grasses, then willow trees, and, still farther up-stream, more complex floral asociations. Not so much of the last had been passed before a muffled ship's bellow made it clear that the Mississippi was but a short distance ahead (Figure 6).

Fig. 3. Dr. Fred B. Kniffen of Louisiana State University enjoying the delicious Louisiana oyster "right out of the shell."

Pilot Town

Pilot Town was reached by four o'clock in the afternoon, and all had an opportunity to make a thorough inspection of this community at the Head of the Passes. The effects of the abnormally high water levels of 1937 were quite evident. Water encroached on the narrow natural levee, on which Pilot Town is built, from both front and rear, and the town's stilted sidewalks seemed very much "to the point".

Other evidences of high water were equally impressive. A great mass of drift wood pressed against a row of piling extending out into the river, and some of it will certainly find its way into cook stoves at a later date. Although a bit inconvenient, the high water caused the local "vacherie" little concern. With their noses partially under water, the cattle nipped the succulent alligator grass, although small, blunt-nosed boats piled high with this food made it apparent that the immediate levee-front supply was inadequate.

Granted that numerous details might be mentioned, it may be of especial interest to indicate the newest type of land utilization in this unique community. The local base ball park has been converted into a miniature tank farm. Louisiana's ever-increasing flood of petroleum has created many extraordinary utilizations, and this one was occasioned by the discovery of the Garden Island Bay field, which, although only a few miles down stream, afforded no favorable site for storage facilities. The baseball field at Pilot Town did provide a site, and with present arrangements loading and unloading for either tankers or barges is effected easily and cheaply[4].

It cannot be emphasized too strongly that Pilot Town means just what it says. This community is of, by, and for ships' pilots. It should be explained, however, that in Louisiana there are two families, or at least genera, of this hardy breed. A treasured incident made this quite clear, and it may not be out of order to mention it here.

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[4] This description has been given with candor because of the inherent interest, but in view of the fact that so many people in other states labor under such erroneous conceptions in regard both to the nature and extent of Louisiana drainage conditions, the author suggests that those unfamiliar with the lower delta area consult a map and note that Pilot Town is approximately 100 miles below New Orleans, and almost contitutes "land's end".

A Moot Point

On the night of March 24, after the wreckage of the evening meal had been cleared from the table, and the geographers were engaged in one of their scheduled discussions, a representative of the BAR pilots came aboard the "Louisiana" to extend the courtesies and facilities of the city. Soon this gentleman was plied with questions concerning his calling, and one well-intentioned but perhaps ill-conceived query related to the relative "service" rendered by the BAR and RIVER pilots. An answer was given, but this poignant matter, let it be known, has been a moot point for many, many years.

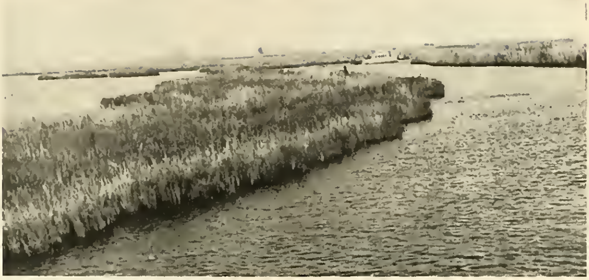

Figure 4. View of the Department of Conservation boat "Ferol" going southeast through the important fur producing marshlands of St. Bernard Parish.

The BAR pilot had been gone but a short time when two representatives of the RIVER pilots came aboard, and it was soon apparent that an "international incident" was "in the making". It will be obvious to the reader that the RIVER pilots ably defended their service. "Trouble" was avoided and the pilots, great fellows that they are, extended their customary hospitality. The author is willing to vouch for the statement that each member of the party will swear by the men who guide ships from the Gulf of Mexico to New Orleans.

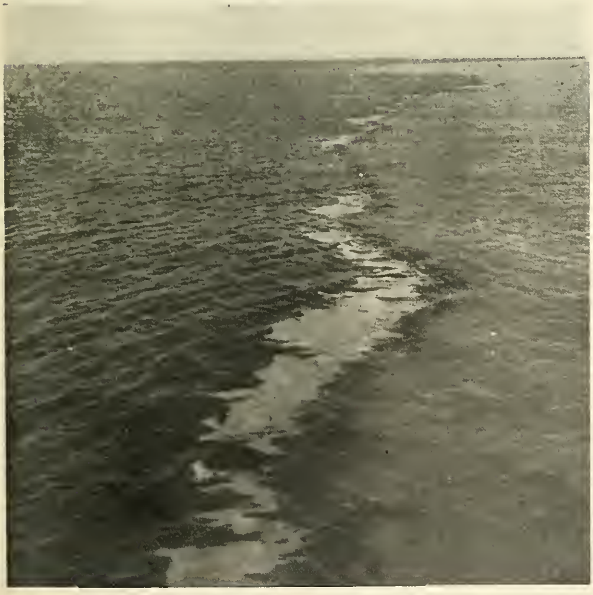

Figure 5. Waters from the Mississippi River (right) showing line of demarcation as it comes in contact with the salt water (left) in Cape Breton Sound near Main Pass. The Mississippi River silt and dissolved materials supply to the warm Gulf waters many of the essential elements that cause them to teem with a peculiar abundance of life. From the waters of Louisiana, were taken, for example, in one year, sixty million pounds of commercial sea shrimp, one-half of the total shrimp produced in the entire United States.

Orange Groves

The voyage up-stream from Pilot Town to Doullut's Canal at Empire on the morning of the third day was likewise favored by fine weather. From the deck of a boat, a turn of the horizon and a little reflection create a certain "stirring" even in those residents of our state for whom Old Man River is usually just a casual acquaintance. River, sky, and flat lands predominate in this part of Plaquemines Parish, but evidences of the intervention of man are not lacking. The orange groves of the west bank, by way of illustration, begin above Venice, and continue upstream for many miles. Perhaps, however, it is man on the river that gives rise to the most lasting memory. A thin wisp of smoke is soon converted into the funnels and hull of a ship. Perhaps she is deep in the water, filled with a product of an oil refinery; perhaps she is of a totally different cast, and is loaded with high-density cotton bales, or her decks are piled high with lumber; maybe her glistening white proclaims the relation of New Orleans to the banana lands of the Caribbean. In any event, it is good to see these ships, and the impression of their great hulks towering above orange trees is one that is not easily thrown aside. If this thought of ships, river, and banks is pushed north into the great Middle West, how can one escape the conclusion that, in spite of competition and temporary adverse fluctuations, Old Man River's commercial burden has just begun.

Perez Hospitality

Empire was reached before noon, and here the boats left the river by means of the state-operated locks and Doullut's Canal which leads to the western marshlands. The next stop was at Dymond Island which was notable for two things: first, the hospitality of Mr. and Mrs. John Perez and daughter, and, second, the relict nature of this island. The history of change in its area—it has decreased in size—together with other conditions, illustrate much that has been characteristic of both physiographic processes and economic evaluation in the Louisiana littoral. In these days of "black gold", a new and lively interest is being shown in earth processes and their bearing on land titles throughout the entire marsh and "prairie" province.

After Drs. Russell and Howe had taken water and sediment samples for use in the research division of the Geological Survey, and the party had thanked the Perez family, the voyage to the west and north was resumed. After passing through Meyers Canal and part of Grand Bayou, the elevated pipes of the Freeport Sulphur Company signalled the approach to their canal. Boats filled with workmen, and others towing barges of yellow sulphur gave evidence of yet another kind of "marshland" wealth, and at the same time proclaimed a tribute to the modern scientific methods and industrial initiative that brought about the development of the Grand Ecaille sulphur property. One of the rare sunsets for which the south Louisiana flat country is justly famous, provided a fitting climax for this third day.

The last night was spent at the point of land which is made by the junction of Bayou St. Dennis and Bayou Cutler. The next morning a pre-breakfast Indian potsherd hunt provided an excellent substitute for the more formal type of setting-up exercises as well as the prelude to passage through such water bodies as Dupre Cut, Bayou Dupont, Bayou Barataria, and Harvey Canal. This last section of the area covered in the delta trip is rich in evidences of former Mississippi River distributary action. Dupre Cut truncates several old channels whose previous existence is certified by complexes consisting of sediment-filled channels flanked on either side by natural levees which gradually decrease in height as they recede into the marsh[5].

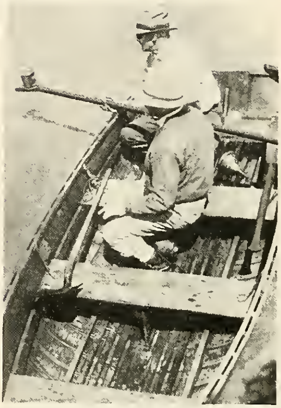

Figure 6. Dr. R. J. Russell (accompanied by Dr. H. V. Howe) taking bottom sample at the mouth of Main Pass.

Although the natural aspects of this Louisiana landscape are dominant, the additions of man are growing in number and magnitude. The smaller structures of farmers, fishermen, and trappers are dwarfed by what might be called the oil landscape. The derricks, storage tanks, workers dwellings, barges, pipe lines and other objects of the Lafitte oil field made it abundantly clear that this particular growth provides a focus of intense interest and importance.

The Lafitte oil field is one of those bits of good fortune which is helping to transform the entire life of a great American state. The nature of the Lafitte development reflects some of the better oil field practices which the Department of Conservation is attempting to promote throughout the state. The extent to which we do this is in a very real sense a test of our American system. It is not a meaningless outburst of academic idealism to insist that conservation mindedness must be the attitude of every resident in Louisiana, and that the Department of Conservation needs the constant help of a citizenry educated in the husbanding of irreplaceable earth resources.

It would be somewhat meaningless to give a detailed account or catalogue of the many interesting aspects of this west-bank, back-door approach to New Orleans. Bayou Barataria and associated features have had a significance all of their own from the beginning—and before—of Louisiana statehood. Harvey Canal, the link which connects these features with the Mississippi River, has likewise acquired a new importance not only because of developments within its own immediate hinterland but because of the increasing tonnage which moves between the Mississippi and southern Louisiana over the Intra-Coastal Canal and the navigable streams which it intersects. There is every reason to believe that this increase will continue.

"Seeing" Eyes

In the last analysis, nothing satisfies but "seeing". As one who has been engaged for many years in helping others learn something of Louisiana, the author is pleased that American geographers want to see more of Louisiana. He is grateful that Commissioner Rankin felt justified in extending the facilities of the Department to a group of men, who, by the nature of their profession will do more to give accurate and balanced descriptions of at least one part of Louisiana than could be expected from any similar number of people in the entire United States.

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[5] Again, for those who are interested in the processes that have created this interesting landscape, it is suggested that the reader consult Geological Bulletin No. 8.

Cheaper FUEL
FOR
INDUSTRY

Louisiana ranks next to Texas as a producer of natural gas . . . Through the conservation measures now in force industry is assured of a low-cost fuel for its power plants in the years to come.

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DEPARTMENT OF CONSERVATION
126 NEW COURTHOUSE BLDG.,
New Orleans, La.

Magnetic[*] Prospecting

By

V. GAVRILOVICH GABRIEL,[1] Sc. D.

and

CLARENCE P. DUNBAR,[2] M. S.

At the present time no oil man will question the usefulness of geophysics[3] in prospecting for oil in the Gulf Coast. However, to many landowners, lease and royalty owners and buyers, and others interested in oil exploration developments, the basic principles of Magnetic Prospecting remain a mystery. The essential purpose of this article is to explain for the non-technical man, who has had little or no training in mathematics and physics, the principles employed in Magnetic Prospecting.

Until 1930 the use of Magnetic Prospecting was widespread in exploration for metals and oil, especially in prospecting for shallow and medium deep salt domes in the Gulf Coast Area. After 1930 its use in exploration for oil in this area was greatly curtailed. However, recently, the introduction of a new compensated system magnetometer by the American Askania Corporation and the micro magnetometers by Barret, Jenny, and others has tended to revive the use of the magnetometer and to insure it a proper place in oil exploration.

(Courtesy American Askania)

Magnetometer Set Up For Use In The Field

If a handful of iron shavings is placed on a sheet of paper over a bar magnet, the shavings will rearrange themselves according to a certain pattern. At two points over the ends of the bar magnet the iron shavings will be gathered in two clusters. Further, the iron shavings will be well disseminated over the paper and will show certain segregation of particles along the line connecting the two ends or poles of the bar magnet. Hence, by observing the interaction between two bar magnets it can be seen that some ends or poles of the bar magnets are attracted and some are repelled by each other. Observations of this sort led the earlier scientists to speculate as to the dual nature of magnetism and to designate one end of the bar magnet as the plus end or pole and the other as the minus end or minus magnetic pole. These early scientists also found that the like magnetic poles attracted each other and the dissimilar ones repelled. Further, Newton's law of universal attraction is applicable to magnetic phenomena. Mathematically it can be expressed by the following formula:

$$F \text{ (Force of magnetic attraction or repulsion)} = \frac{A \times M \times m}{r^2}$$

Where:

M, m = magnetic masses or densities

r = distance between two poles

A = constant

One unit of magnetic force or field strength is called a Gauss, in honor of a great German mathematician and physicist. A much smaller unit is used in magnetic exploration, the so called gamma, γ. One gauss is equal to 100,000 gamma units.

By observing the behavior of a compass, which is nothing but a special case of a bar magnet suspended on a vertical pivot, the early scientists discovered the presence of the earth's magnetic field. The magnetic needle of a compass placed at any point of the surface of the earth will always point toward a certain spot or point situated in the earth. Its projection on the earth's surface is at 73° 35′ of latitude, 204 degrees and 21 minutes east from Greenwich, England. This identical spot or point is also situated in the southern hemisphere. These two particular magnetic points of the earth are designated as the North and South Magnetic Poles of the earth. Likewise the end or pole of a bar magnet or magnetic needle attracted by the North Magnetic Pole of the earth is marked by the letter "N". It is clear from the above mentioned considerations that, magnetically speaking, the earth is simply a complex form of bar magnet. Moreover, the behavior of a compass manifests the presence of the earth magnetic field of the earth. By the use of many magnetic observations and from the knowledge of the form of the earth, the intensity and direction of the earth magnetic field is well known at many points. In the literature this field is referred to as a normal earth magnetic field. Further, by making very detailed magnetic observations it was possible to establish the fact that from point to point there are great variations in intensity and direction of the earth's magnetic field. These variations, so called, local and semilocal magnetic anomalies, are due to the presence of magnetic material disseminated in the upper crust of the earth near, geologically speaking, the point of observation.

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[*] The authors wish to thank the American Askania Corporation of Houston, Texas, for their cooperation in providing cuts and pictures of some of the illustrations used in this series of articles. They also wish to thank Miss Frederica Killgare, Houston Public Library, and Mr. Thomas F. Ryan, Attorney, Cutrer and Murfee, Houston, for many helpful suggestions and criticisms in the preparation of the manuscript and Mr. J. A. Gerson, Houston, Texas, for assistance in preparing the drawings.

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[2] Consulting Geologist, Second National Bank Building, Houston, Texas.

[3] Some publications containing well rounded discussions of geophysics are: "Methods of Practical Geophysics" by R. Ambronn, "Handbook of Geophysics" (in German) by Beno Gutenberg, "Geophysical Methods of Prospecting" by C. A. Heiland, and "Applied Geophysics" by A. S. Eve and D. E. Keyes. Some of the authors who have made notable contributions to the theory and practice of Magnetic Prospecting are: Aldrich, Barret, Clifford, Collingwood, DeGolyer, Eve, Hutchinson, Hazard, Heiland, Hotchkiss, Jenny, Levine, Lynton, Rieber, Pautsch, Pugh, Slichter, Somers, Spraragen, Stern, Williams, Wilson, and others in the United States. Space does not permit the listing of numerous authors abroad who have made notable contributions to the theory and practice of Magnetic Prospecting.

The magnetic needle set at the surface, near the place of accumulation of magnetic material, will be under the influence of both the normal magnetic field of the earth and the magnetic field due to the presence of the local magnetic field or anomaly.

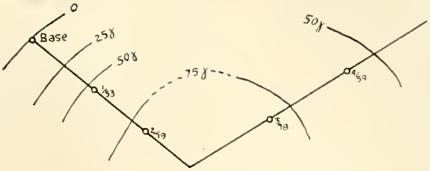
Magnetic Anomalies:

Magnetic prospecting consists in dealing with magnetic anomalies, localized in the uppermost layers of the earth crust, which are due to the presence of highly magnetic rocks and minerals. These minerals and rocks possess a very wide range in magnetic intensity. In order to recognize these rocks magnetically the concept of permeability, designated by the Greek letter "N" is used in physics. For practical purposes the concept of susceptibility designated by the Greek letter "n" is used. The permeability is connected wih the susceptibility by the following formula:

$$N \text{ (Permeability)} = 1 + 4\pi n = 1 + 12.5\, n \quad \text{(Approximately)}$$

Ambron and Heiland give the following table on the susceptibilities of different rocks and minerals:

An example of profile prospecting is given in Sketch 1. The values of the magnetic anomalies are given below the magnetometer stations.



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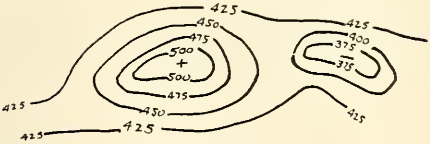
Sketch 2 represents a typical magnetic map with isonomalic lines (contours) drawn at intervals of 25 gammas. It shows one magnetic high of approximately 75 gammas and a smaller magnetic low of approximately 50 gammas.



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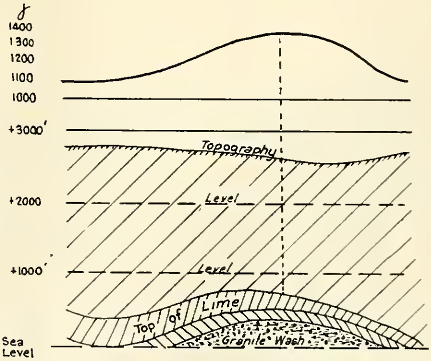
Sketch 3 shows a large positive magnetic anomaly of approximately 300 gammas over the highly magnetic granite wash nearly 3,000 feet below the surface. It is interesting to note that the surface elevation shows a depression over the structural high.



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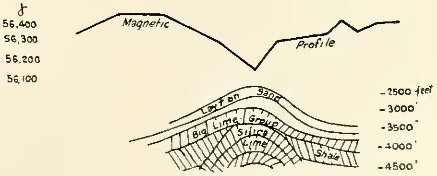
Sketch 4 shows a large negative anomaly over a sharp anticlinal structure. It is also interesting to note that the anomaly shown in Sketch 3 is positive while the anomaly shown in Sketch 4 is negative.



The isogams, that is, the isonomalic lines are interpolated between the stations and drawn with 25 gamma unit intervals. In network prospecting the isogams are drawn by interpolation between the stations and by connecting the points of equal magnetic anomalies.

APPROXIMATE TABLE

Rock or Mineral	Susceptibility Multiplied by 1,000,000
Magnetite (Mineral)	93,350
Franclinite (Mineral)	35,640
Ilmenite (Mineral)	30,740
Olivine Gabbro	5,600
Gabbro	3,300
Specutarite	3,215
Serpentine	1,274
Granite	1,000
Basalt	600
Limonite (Mineral)	220
Dolomite	1
Quartz (Mineral)	0
An average for sediments	40
Limestones	10
Rock Salt	From 0.4 to 0.8

History and Instruments Used in Magnetic Prospecting:

The magnetic needle has been used in iron exploration since the end of the 18th century. The use of the magnetic theodolite for the same purpose was begun in Sweden in the 19th century. The introduction of a magnetometer to measure local and semilocal magnetic anomalies by Ad. Schmidt of Germany in 1915 has given a strong impetus to magnetic prospecting. Quite recently Hotchkiss of the U. S. A. introduced a new dip needle which is widely used in the Lake Superior Region in exploration for iron deposits.

EXAMPLE OF FIELD NOTES IN MAGNETIC PROSPECTING

Magnetic Surveying
By John Doe

Sensitivity equal 30.2 Gammas Per One Scale Division

Sta. No.	Position	Time	Index	Temp.	Readings	Avg.	Tot. Avg.	Temp. Corr.	Base Corr.	Temp. & Base Corr.	Tot. Avg. Temp. & Base Corr.	Minus Base	Times Scale Value	Lat. & Long. Corr.	Corrected Reading
13	Base	12-17	146.0	11.5-9.3	E 21.2-22.0-21.1	21.1		+1.5	—	—	22.9	—	0	0	100γ
		10-20			W 21.8-21.7-21.8	21.8	21.4								
14	2 Miles	12-17	183.3	2.2-2.0	E 21.5-21.5-21.4	21.5									
	S	10-31			W 20.7-20.7-20.7	20.7	21.1	+0.3	0	+0.3	21.4	—1.5	—42γ	+22γ	80γ

The earth's magnetic field has both direction and magnitude. Any magnetic, local or semilocal anomaly, may be treated as a special case of a complex bar magnet and should have a definite magnetic field expressed in both direction and magnitude. In order to evaluate a magnetic field it is necessary to measure either the total field in magnitude and direction or its horizontal and vertical components. Schmidt's magnetometer measures the horizontal and vertical components of a magnetic field separately. The instrument (See photograph of magnetometer) is first adjusted in the laboratory in such a way that in the field it records nothing but the differences in magnetic vertical or horizontal intensities between the base station and any point of observation. In order to obtain reliable observations corrections must be made for daily variations in the earth magnetic field, geographical latitude and longitude, and temperature, for a non-compensated system, should be taken into consideration at each observation station.

Use of Magnetic Prospecting:

Magnetometers are widely used in exploration for magmatic segregations, veins, dykes, etc., which carry some highly magnetic minerals such as magnetite, franclinite, and ilmenite. Some exploration for gold has also been carried on with magnetometers in magnetic-gold bearing placers in Colorado and Alaska.

Oil cannot be detected directly by a magnetometer. However, oil, especially in Texas and Louisiana, is usually associated with anticlines, monoclines, fault zones, volcanic plugs, and salt domes. The sedimentary and igneous rocks which form these favorable oil structures have a small or large amount of magnetic material disseminated through the formations. Further, many of these structures are deep seated and the surface geology does not suggest any clues as to the true underground conditions. Hence, it is quite natural that many men in the past have sought to apply magnetic prospecting in oil exploration.

Magnetic Surveying Over Oil Structures:

As was pointed out in the previous discussion, the Schmidt's magnetometers measure the differences in the horizontal and vertical components of magnetic anomalies. In measuring these differences a permanent magnet is inserted in the hollow magnetic tube placed under the center of the magnetometer in order to counterbalance the normal earth magnetic field. When an equilibrium is reached between the inserted magnet and the earth magnetic field the indicator will show a "O" scale reading. In practice a "O" scale reading is marked by a number "20", which means that when the scale indicator shows "20" the magnet occupies a horizontal position. After checking the value (the so called sensitivity of one scale division being computed in gamma units), the Schmidt's magnetometer is placed at the Base Station, situated in the area under magnetic investigation, and the readings are taken. The same readings are also taken at the observation stations and the differences in scale values between the observations stations and the base stations are computed. In order to express a local anomaly in gammas the scale differences should be multiplied by an instrument constant, which is nothing but a sensitivity or scale value of one scale division measured in gammas.

An experienced magnetometer operator is able to set-up the instrument at the station, orient it properly, take scale and temperature readings, arrest the system, and be ready to start for the next station in less than five minutes.

Magnetic surveying is carried out along single lines (profiles) or by the use of a network of instrument observation points. In reconnaissance work the magnetometer stations are placed from one to two miles apart, whereas in prospecting for faults, mineral dykes, and special problems, the interval may be as small as 25 feet.

Units Magnetic Field Book:

The readings and observations in magnetic prospecting are usually kept in the following way:

In profile prospecting the anomalic magnetic differences are computed and put on a map just below the number of the magnetometer station. Very often the isogams or lines of equal magnetic deviation, so called isonomalic lines, are drawn on the map with the intervals equal to 25 gamma units. However, recently with the introduction of the micro-magnetometers and the compensated system magnetometers, the isonomalic lines are drawn with smaller intervals, sometimes as small as 5 gammas.

The interpretation of magnetic data is a very complicated and highly specialized type of work. The magnetic guide table given below helps to explain in a simple and systematic way the basic principles of magnetic interpretation. It should be always remembered that often similar (high or low) magnetic pictures of anomalies might be the result of very dissimilar structural conditions. Usually the elimination of structures and conditions underground, which according to a study of the local geology cannot be represented by that particular magnetic picture, plays a very important part in deciphering the underground conditions from the magnetic data.

MAGNETOMETER GUIDE TABLE—After V. G. Gabriel (Copyright Reserved)

+Means a positive anomaly or more magnetic than the surrounding rocks.
—Means a negative anomaly or less magnetic than the surrounding rocks.

Structures	Anomalies Depend On:	Dependability of Magnetic Maps Depend On:
Anticline Plus, more common Anticline Minus, less common	1. Presence of Mag. Material	1. Number of Stations 2. Small daily variations
Syncline Minus, more common Syncline Plus, less common	2. Amount of Material	3. Small T° Correction 4. Relatively large Isogamic Intervals
Fault Plus, more common Upthrow side	3. Thickness of Formation	
Basic Igneous Plus, more common Intrusions	4. Length of Formation	5. Correlation with Geological Possibilities
Volcanic Plugs Plus, more common	5. Depth of Formation	
Salt Domes Minus	6. Its Past History	
Thickening of Mag. Formation Plus	7. Surrounding Formations	
Thinning of Mag. Formations Minus		
Highly Magnetic in Low Mag. Formations Plus		
Slightly Magnetic in Highly Magnetic Formation Minus		
Reversed Polarization Plus—Minus Overturned Structures Plus—Minus		

———o———

Louisiana Minerals Valued at $110,000,000

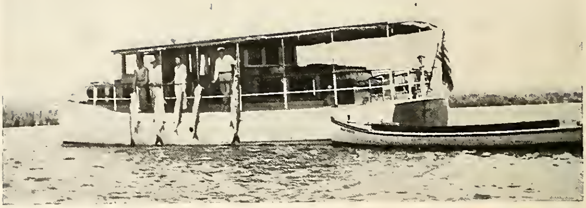
Louisiana's production of minerals in 1936 was as follows: crude oil, 78,227,132 barrels; natural gas, 296,957,779 cubic feet; sulphur, 288,099 long tons; rock salt, 551,103 tons; brine in solution, 368,510 tons; gasoline extracted from natural gas, 58,815,350 gallons; carbon black, 59,161,728.25 pounds. A rough estimate of the total value of these minerals at the source was $110,000,000.

———o———

The value of the Louisiana oyster crop for 1936 is estimated at $1,250,000.

Tarpon Fishing in Louisiana

By **EUGENE J. McGIVNEY**



The yacht "Susan McK."

With fishermen, like the outlook on other things with many people, distant fields always seem the greenest. These thoughts occurred to the writer at the time when President Roosevelt was fishing off the coast of Corpus Christi, Texas. Because of the well known reputation of that location for good tarpon fishing, it has been a Mecca for fishermen, even from our own State. Yet, in Louisiana, at the mouth of the Mississippi river, at the right season, tarpon are as plentiful as at any place that tarpon frequent. As far as this writer knows, this location for the very best tarpon fishing is practically unheralded.

Just why tarpon congregate at the mouth of Southeast Pass of the Mississippi river, about the middle of the month of November, probably only a student of fish migration can give us the scientific reason; but they are there. Native fishermen say that the fish are there every year. We found from our visit that, beginning about four o'clock every afternoon, for two or three miles up from the mouth of the Pass the water seems alive with jumping tarpon, feeding on mullets which are always to be found there in great schools during the Fall months.

The skipper of the yacht Susan McK., Doctor E. G. Simmons, with his guests, Fisher Simmons, Ernest Miller and the writer, left New Orleans with expectations of repeating a previous year's record catch of redfish and sheepshead in Redfish Bay, at the mouth of Southeast Pass, and, incidentally, went prepared for a day's try at giant jew fish and monster stingrays which haunt that neighborhood. Tarpon was not scheduled, and the tarpon fishing we got into was a real surprise.

The catch of redfish and sheepshead at Redfish Bay was repeated —there is probably no more promising place for such fishing than Redfish Bay when the weather conditions are favorable. Shrimp and mullet are there in the shallow waters of the Lake in October and November and the big fish follow their favorite food.

The skipper "Doc Simmons."

Tarpon Jumping

Tarpon began to jump in the Pass right in front of the landing. The writer made a cast with a metal spinner, and almost immediately was hooked up with a tarpon which made a jump or two and took the spinner and a part of the line. With a new equipment gotten from the yacht, a further attempt to land a tarpon, while sitting in a chair on the wharf, kept the writer busy. It may be done with a larger line—the Loga boys say they do it with a hand line, using a window sash cord. But, with a standard equipment of a five-foot rod, an eighteen pound test line and a star drag reel, the writer could not land either one of the five and six-foot tarpon that were hooked by him.

When the balance of the party were returning from their afternoon fishing in Redfish Bay, as they entered the Pass, from a ditch, they observed the writer struggling with a large tarpon, with about two hundred feet of line out, and the tarpon still gaining. When the tarpon rose again, he appeared right alongside Doc's skiff, close enough for the tarpon to see Doc, which was too much for the fish, and off went the tarpon and my hook and a part of my line. But Doc was as much surprised as the tarpon, because, when he first saw me struggling with a bent rod, with a long line out, he thought I was putting on a pantomime to fool him. Since he saw me sitting comfortably on the wharf, he could not conceive that I was really hooked up with a tarpon.

170-Pounder

It was late in the afternoon, but Fisher Simmons started out after tarpon, and landed two—one measuring six feet eight inches, and the other nearly six feet. It took him about two hours to land these two beauties. The next afternoon, we

(Turn to Page 36)

Research on Iodine Content of Louisiana Foodstuff

By HAL W. MOSELEY

Professor of Chemistry, Tulane University

Six years ago, this fall, a young man from the Carolinas entered Tulane to pursue graduate studies in Chemistry. Among other requirements for an advanced degree in this science is the prosecution of an experimental research problem. When his graduate work had progressed to the point where the assignment of the problem was being considered, both of us were struck with the possibilities to be found in Louisiana vegetables in relation to their iodine content. We had known of the iodine work of Remington and others in South Carolina and of the extensive survey of food materials made in that State along this line. In advertising, and on automobile license plates, South Carolina had been known as the "Iodine State" as a result of this work. We considered that the lower Mississippi Valley, and Louisiana in particular, offered a very much better source of soil iodine than was presented in the soil of the Atlantic sea-board. Immediately it was decided that here was an interesting and practical research project for him to undertake and for the Tulane Department of Chemistry to explore and encourage. Work was begun in the Fall of 1930, and has been continued more or less actively since that time.

It will be remembered that the Gulf of Mexico extended quite far into the interior of North America in past geological periods and that the lower Missisisppi Valley, including our own State, had been laid down in the salt water of the Gulf as the Mississippi River has brought down its annual deposit of silt throughout all this period. Land is even now being built up by the river as its suspended material is deposited in the Gulf. This suggested that our soil, following the manner of its deposit, would of necessity contain a greater portion of salts of the sea than that deposited in the valleys of the interior. Furthermore, as work of the South Carolina chemists had shown, the iodine content of vegetables grown inland was somewhat greater than in those grown nearer the sea-coast. This was explained on the ground that iodine containing materials from disintegrating rocks has been washed down from the mountains into the valleys, and on the ground that the salt spray from the Atlantic had been mechanically carried inland by the winds and in the course of precipitation had fallen on the soil and enriched it.

This article will give our readers a glimpse into that strange land where scientists labor with stuff that dreams are made of. It is but a brief excursion into the extensive and important research that is being conducted by Professor Moseley on the iodine content of Louisiana food materials.

Being quite near, and on the Gulf Coast, not only have we had the land deposited in salt water, and the long continued deposits of mineral matter containing iodine from the Mississippi River, but we have also had the copious precipitation of salt spray from the Gulf throughout this whole area. With these facts in mind, it was our hypothesis that Louisiana soil should offer exceptional fertility with respect to its iodine content. It was therefore to be expected that vegetables, and food stuffs in general, grown in this State, would reveal a significant amount of iodine in comparison with results obtained elsewhere.

Medical reports had informed us also that goiter was not at all prevalent in this section of the country. In fact the Federal Draft Board had published figures to show that only 0.62 men in 1000 examined showed evidence of goiter in certain Southern States, while in other regions 17 men in 1000 were found to be afflicted with goiter. It is thus quite apparent that goiter is thirty times more prevalent in some of the inland and far Western States than in this section. Here, again, we had a strong indication of the fact that Southern States' food products were furnishing the people with more necessary iodine than elsewhere, and because of this, and other reasons mentioned, we believed that analyses would reveal a larger amount of iodine in our foods than had been shown by similar work in other states.

The solution of the problem pointed, therefore, to the very practical matter of a possible commercialization of Louisiana food products on the basis of their valuable mineral composition, and the importance of such information in its relation to medical studies on goiter and to State and Government health activities in Louisiana Parishes.

It might be said, parenthetically, that three-fourths of the manufactured foods put up in the United States, commonly known as "can goods," is grown in that region of

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the United States in which the prevalence of goiter is greatest.

Somewhat later, after the first results had verified our general assumptions, another research student whose interests lay more in sea foods than in vegetables, undertook the examination of such foods as shrimp, crab-meat, oysters and oyster juice. The results in this added field of investigation came out surprisingly. The program of iodine studies was continued and eventually included our Louisiana citrus fruits.

Upon casual examination of these results it is a natural and almost inevitable conclusion that the uniformly high values might have arisen from some constant errors in our analytical procedures. This possibility was not overlooked. We may feel assured that in all cases subsequently cited the results are reliable even though they seem to be remarkable.

Method of Procedure

The amounts of iodine found in food stuffs are expressed, generally, in parts in a billion parts of material, both on the dry and wet basis. This amounts to saying that you would have one pound of iodine in a billion pounds of dried vegetables. A billion pounds of vegetables would be 500,000 tons. Small amounts like this would ordinarily be missed in the routine of chemical analysis. The detection of these minute quantities, and the accurate determination of them, presents many difficulties to the analyst, and it is not surprising that a special technique had to be developed in this work. Analytical work of this character is often referred to as microchemical analysis.

In turning now to some of the experimental results, we shall first consider the vegetables we have examined. It must be realized at the outset that the same vegetables may be grown in several parishes and at different seasons of the year and under different conditions of cultivation and rainfall, and that the same vegetables grown in separate parishes or in the same parish on different farms may vary in iodine content, but they are in general of the same order of magnitude. Our materials were all obtained directly from known sources, were picked fresh, brought to the laboratory, and immediately prepared for analysis. After they had been completely dried and prepared they were stored in well sealed bottles and labeled. In this form they may be kept a long while in an iodine free atmosphere before final analysis.

Comparisons

We shall make a few comparisons of the results with two other states from which data are available and shall use some common vegetables. Vegetables contain high percentages of water so that these figures in parts per billion are on the dry basis.

Vegetables—	La.	S. C.	Fla.
Beets	2500	279	220
Carrots	2500	235	240
Irish potatoes.	2300	211	173
Turnips	4100	293	235

It is seen from the figures that these Louisiana products have from 10 to 15 times the iodine content of those grown in two other Southern States and one of these has been called the "iodine" state. Many other vegetables could be used to illustrate the same variety of differences. In the smallest values encountered, the Louisiana work shows double the amount of iodine found elsewhere.

Now I am sure you will be interested in hearing about our Louisiana citrus fruits. Unfortunately we have little data from other states for an adequate comparison, but the same general order of magnitude holds as in the vegetables. The Louisiana "Naval" Orange, using both pulp and juice, contains 1800 parts per billion and the strained juice shows 620. The "Louisiana Sweet" Orange has 2300 for the pulp and 1700 parts per billion for the strained juice. Considering these results it is obvious that straining the juice takes out a large part of the iodine.

We could not resist considering the famous orange wine and found that wine made from the "Louisiana Sweet Orange" contained 500 parts per billion in the finished product. The Kumquat came in for consideration and gave a good account of itself to the extent of 2580 and preserves made from it locally still showed 2100 parts per billion. The samples were taken directly from the groves at Buras during the crop year of 1933-34.

Home grown grape fruit and lemons were examined at the same time as the oranges and compared favorably in results with the other citrus fruits from Plaquemines Parish.

Strawberry specimens from Tangipahoa Parish have been obtained but not yet analyzed. On account of lack of time and the money necessary to employ full time research assistance something like 100 specimens already collected from several parishes contiguous to New Orleans have not been touched. An enormous amount of work remains to be done even in those parishes near by, to say nothing of outlying sections. In connection with vegetables and citrus fruits the following parishes have furnished specimens: Orleans, St. Bernard, Plaquemines, St. Tammany, Tangipahoa, Assumption, St. Mary, Terrebonne and Lafourche.

Sea-Foods

Three of the principal and very widely used sea foods are oysters, shrimp and crab-meat. All three of these find their way to the table in a variety of forms and in our own city and neighboring cities great quantities of this type of local sea-food is consumed. Louisiana waters produce nearly half of the shrimp caught in the United States and oysters and crabs are fished in large quantities as we all known. All three of these sea-foods are known to contain large quantities of iodine and have been recommended as food for aenemic and goitrous individuals.

A great deal of shrimp is canned in Louisiana and we have some information on canned shrimp as well as fresh shrimp. On the dry basis an average of a number of specimens of canned shrimp gave 5000 parts per billion, while fresh shrimp from a variety of sources showed an average of 2500 parts per billion. Dried shrimp prepared for the export trade were found in two instances from a 1931 catch to have

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Behold the "Headless" Shrimp!

Shrimp trawl off Breton Island, La., Gulf of Mexico.

One Animal That Fares Better Without His Head

The head is considered a rather important part of man's anatomy—detached, it is apt to lose its importance in the scheme of things. In the case of the Louisiana salt water shrimp, however, it gains in importance after it is removed from the body, physiologically if not psychologically.

While the head of the Louisiana salt water shrimp may not be beautiful, and contributes little to the aesthetic or cultural advance of civilization, its separation from the body is an expedient that has revolutionized the shrimp packing and shipping industry. With the development of modern processes of refrigeration it is now possible to transport this marine delicacy to distant parts of the country, even to remote corners of the globe, the poundage of the shipment being reduced from 210 to 135 pounds, which is an appreciable factor in transport charges.

The value of the shrimp's head to society seems to be enhanced by decapitation, as both the head and hull make very good commercial fertilizer. Whether the shrimp is sensitive to such an ignominious end has not been disclosed, leaving something for the scientists to worry about, now that they have removed a section of man's brain in which his intellect is located and discover that the dumber he is, intellectually, the more successful he is apt to be in mundane affairs.

J. B. Dauenhauer, Jr., director of the Fisheries Division, Department of Conservation, states that this new development in handling and shipping the salt water shrimp in its raw state is bringing many new industries into the state. Several companies have been organized and are now shipping their products throughout the United States. Far Eastern companies have been interested in the development and are investigating its possibilities.

These "headless" shrimp are packed in cartons and with modern refrigeration reach their destination in perfect condition, in their raw state. Two large wholesale fish dealers from Florida have entered Louisiana to engage in the "headless" shrimp business.

Mr. Dauenhauer reports that for the first quarter of 1937, ending April 30th, revenue derived from fresh water netting licenses amounted to $3,705; from dealers' licenses, $18,100; a total of $21,805.

While the salt water fisheries were not affected by the same conditions as the fresh water, there was a scarcity of salt water shrimp, due to weather conditions. During 1936 there were 60,000,000 pounds of salt water shrimp, valued at $2,100,000 at the fishing grounds, taken from the Louisiana waters; and Mr. Dauenhauer believes the 1937 catch will surpass this amount.

The revenue collected from salt water netting licenses for the first quarter of 1937 amounted to $4,885.

The severance tax collected on canned, packed and headless shrimp, which were sold through local markets, amounted to $1,201.84; on Louisiana shrimp packed by Mississippi packers, $1,597.40; on dried shrimp, $848.21; making a total of $3,647.45.

The collections of the Fisheries Division for the first quarter of 1937 totalled $30,437.45.

The total "take" of Louisiana salt

—Anthony V. Rogusin Photo

Cargo of shrimp from Louisiana coastal waters.

water shrimp for the same period was 6,574,239, valued at $230,088.37.

A matter of interest to the sporting fishermen and to Conservationists at large is the agreement made by Commissioner Wm. G. Rankin with the Mississippi and Texas Fish and Game Commissions, for the closing of Eagle Lake on both the Louisiana and Mississippi sides, to all commercial fishing—also Caddo (in both Texas and Louisiana) and Cross Lake, in Caddo Parish, for the months of March and April—thereby creating natural hatcheries and havens for the anglers.

Under the supervision of the Fisheries Division is the work of rescuing game fish that have been caught in barrow pits along streams that have swelled to the overflow stage. As the waters recede these fish are caught in the barrow pits and if not rescued there is a loss of millions of fish. In this work the fish are taken from these pits and placed in public streams that have become depleted.

During the year 1936 the Department of Conservation distributed from the State Fish Hatcheries, to both private and public streams, about 3,000,000 fingerlings. These distributions were made to applicants on file, and at a nominal cost of $2.00 to each applicant to partly defray the cost of transportation to private ponds and lakes. There is no assessment made on distributions to public streams of the state.

Owing to the close co-operation of the commercial fishermen and fish dealers with the Department of Conservation the Division of Fisheries is looking forward to an increase in its revenues from this source during the year 1937.

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Tarpon Fishing in Louisiana

(Continued from Page 32)

caught five more—the writer being fortunate enough to land one about the same size as that caught by Fisher the afternoon before.

The experience is one the writer will never forget. Ernest Miller volunteered to row the skiff; and after my big tarpon was hooked, we started up the Pass, towed by the tarpon, and we went further and further up the Pass until we were two miles away from the yacht. It was dark before the tarpon was gaffed and in the boat—one hundred and seventy-five pounds of fish, according to the scales at Pilot Town. Doc caught one of the big ones, and in order that our story may be proved, he took the photographs which are offered in evidence along with this story. For other proof, we offer the testimony of our good friends, the Bar Pilots, who were on duty at Pilot Town, where we stopped long enough to exhibit our catch and to have the fish weighed.

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Research on Iodine Content of Louisiana Foodstuff

(Continued from Page 33)

iodine contents of 3400 and 4600 parts per billion. From some of the results it has been shown pretty definitely that there is a loss in iodine during the process of home cooking. A loss of as much as 25 per cent has been observed, in some instances, while in others 10 per cent loss resulted.

Oysters are known to vary in iodine content depending upon the season. Winter oysters differ from Spring oysters along the Pacific and Atlantic coasts, and there is some variation to be observed along the Gulf coast as reported by the United States Government. Our Louisiana oysters from one bedding ground averaged for a year 9500 parts per billion, and as high as 11,500 in special cases. These values are about three to five times those reported by the government for the coast regions. Oyster juice so frequently used by housewives locally in the preparation of soups, gumbos, stews, and stuffings, is a very exceptional source of food iodine. From a number of experiments running over a period of the year it was found that an average of 4000 parts per billion of iodine was contained in the juice. Considering the unwashed oyster together with the juice, values as high as 18,000 parts per billion have been obtained from various bedding grounds in Louisiana.

Crab-meat in Louisiana shows 2800 parts per billion for the dark meat and 2600 for the light meat, as against 490 and 870 averages for the United States as a whole.

These three types of sea-foods available in Louisiana salt and brackish waters shows them to be superior to those of other sections with respect to iodine, and I may hazard the statement that the full quality of our products is of such a nature as to compete successfully with the products of the other sections of the country on the open market. While we have not yet been able to undertake the determination of the other minerals constituent in these sea-foods, it is reasonable to assume that they are likewise as high in proportion. It is the earnest hope of all of us who have been interested in these findings that, in the near future, some adequate provision may be made for thorough and exhaustive study of the complete mineral composition of our sea-foods, including such valuable constituents as copper and manganese. This can be made possible, along with the completion of the vegetable survey, only if funds are available to meet expenses and employ competent chemists for this research project.

I cannot close without paying tribute to our research assistants, Miss Margaret C. Moore and William E. Merrill, for their unselfish devotion to this work, and to give expression of appreciation to Dr. George M. Curtis, research professor of Surgery in Ohio State University, for his interest and cooperation.

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Fresh Water Fisheries Produce $2,560,000

The production of Louisiana fresh water fisheries in 1936 was as follows: catfish, 4,500,000 pounds; gaspergou, 1,750 pounds; spoonbill cat, 750,000 pounds; buffalofish, 10,000,000 pounds; terrapins, 8,500 dozen; fresh water turtles, 865,000 pounds; frogs, 2,750,000 pounds, fresh water shrimp, 22,000,0000 pounds; crayfish, 1,500,000 pounds; "baby" green turtles, 6,000,000 pounds. A rough estimate of the total value of these fishes at the source was $2,560,000.

Rearing Bobwhite Quail in Confinement for Restocking Purposes

By

CHARLES C. BASS, M.D.

The bobwhite quail is the most widely distributed and abundant wild game bird in the United States. He has been able to survive more generally and over a wider territory than any other game bird, notwithstanding the hazards of disease, parasites, changing and diverse agricultural and forest conditions, predators of many kinds and the ruthless hunter with his improved arms and ammunition and his trained bird-dog. Although some of these enemies may have reduced this great bird to very small numbers in some areas bobwhite has never been entirely eliminated from any large area where he ever was abundant. Enough seed stock remains for restoration, in time, if the causes of the decline are checked or removed. Of course, there cannot be on any area, for considerable length of time, more quail than the carrying capacity of that particular area. If, however, as the result of predator damage, excessive hunting or other influences the quail population of a given area is reduced to a very low level, it may take some time for the number raised during a season to equal the full carrying capacity of the land.

Releasing Breeders

Such a desirable increase and restoration of the quail population can be promoted and hastened by releasing breeders, especially just before the breeding season in the Spring. Recognition of this fact has created a great desire and demand for stock for this purpose. One source of supply has been imported wild-trapped birds from Mexico and from bootleg sources. Another source which has rapidly gained in importance is birds reared in confinement.

During the past several years, methods of rearing bobwhites in confinement have been discovered and improved until now they are reared, literally by the thousands, on game farms of many of the states, some of which operate large quail hatcheries and are expanding their capacities rapidly. In addition, private breeders are operating hatcheries and some of them are rearing large numbers of birds for sale.

It is to be hoped that state game authorities will encourage private breeders by purchasing their surplus stock for releasing instead of growing, on state financed and state operated farms, all they need for this purpose. Of course, if everything had to be counted, the cost of birds reared by the state would be more than they would have to pay to private breeders.

Thus far, the whole enterprise has been experimental, to a large extent, and, in fact, there is a lot more experimental work yet to be done. During this experimental period, it is quite in line with good public policy for the state game authorities to participate in the work and to bear the expense of working out best methods and practices.

Through correspondence and through personal visits, in some instances, I have obtained first-hand information about quail hatcheries in several states and am glad to pass on to others who may be interested, some of my observations and impressions.

White Oak Quail Farm

White Oak Quail Farm, located some eight miles south of Richmond, Virginia, is operated by Mr. W. B. Coleman, who is looked upon as the pioneer and leading authority on rearing bobwhites in confinement by artificial means. Years of experimental work, first at the Virginia State Game Farm and later as Superintendent of White Oak Quail Farm, enabled Mr. Coleman to design equipment and develop methods

Huey P. Long Quail Hatchery, Lacombe, La.

of incubating, brooding, rearing and holding quail in confinement, which not only have been highly successful, but have been adopted, either with or without modifications, by most other private breeders and state quail farms.

The eggs are incubated in a standard make (Buckeye) forced draft incubator, made for hatching chickens, the egg trays of which have been altered so as to be adapted for quail eggs.*

Quail Chicks

The young quail chicks are transferred from the incubator directly to the brooder pens which are out in the open. These brooder pens are about 1½ feet wide, 6 feet long and are about 2 feet above the ground. Their essential features are a brooder compartment containing a thermostatically controlled electric brooder-heater or hover and a wire bottom runway. The brooder compartment is enclosed to protect the chicks and the brooding and feeding equipment from rain. The runway is enclosed with wire and has a removable cover for protection against sun and rain.

The birds are kept in the brooder pens until they no longer need the heat (about 4 to 6 weeks) after which they are transferred to growing pens. These are about 4 feet wide, 10 feet long and 2 feet deep. The bottom is covered with ¾ inch (or 1 inch) hexagonal poultry netting; the sides and top with half inch hardware cloth. One end is a board-enclosed compartment in which the feed and water are placed. The birds are shut up in this compartment at night and when the pens are being moved about from place to place. These pens are placed on the ground in a large level field and are moved at frequent intervals. In this way the young birds have access to grass, dirt and trash to pick and scratch at, much as they do in nature; still they are confined and under control at all times.

The birds may be disposed of direct from the growing pens which can also serve as holding pens or they may be transferred to other holding pens until they are disposed of or are placed in the laying pens before the breeding season begins.

The laying pens are about 1½ feet wide, 8 feet long and 2 feet deep with wire bottoms, about 2 feet off the ground. Only one pair of birds are put in a pen. Bobwhites are not polygamous and refuse to adjust themselves, with any degree of satisfaction, to multiple breeding as is practical with domestic poultry.

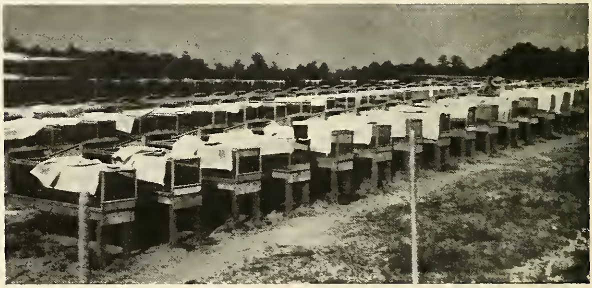
The birds lay well in these pens, some of them being very prolific. Mr. Coleman showed me one hen that had layed an average of 121 eggs a year over a five year period and another one that had layed an average of 134 eggs a year during four years. That is better than many a chicken hen does. The fertility of the eggs is as good as that of chicken eggs and the hatching of the fertile eggs is about the same.

As a result of much experimental work, Mr. Coleman has developed a complete feed mixture, known as the Coleman Quail Mash. It is fed exclusively to the young quail from the start except that some green feed is given, such as fine chopped lettuce, clover or alfalfa leaves. After the birds are 6 or 8 weeks old they are fed also a grain mixture known as the Coleman Quail Grain Feed.

The Pioneer

By following his methods, Mr. Coleman has reared from about 11,000 to about 13,000 bobwhites a year for several years. His success is due largely to careful attention to detail and to good judgment in making practical application of information gained from observation and study of the problems involved. He is a pioneer who has succeeded where others have failed.

The Virginia State Game Farm is



Coleman type quail brooder pens. White cotton duck covers used to keep out sun during heat of day. Maryland State Game Farm.

Brooder house for quail, with temperature and moisture control. Maryland State Game Farm.
Courtesy E. Lee LeCompte, State Game Warden.

located near Providence Forge, about 25 miles east of Richmond. Some of Mr. Coleman's early experiments were conducted by him at this farm and a large amount of the Coleman type equipment and methods are used now in rearing quail. It is interesting, however, that they have been bothered so much with disease and with other troubles until the Superintendent, Mr. J. C. Wall, told me he was tempted to go back to the former method of using bantam hens for foster mothers. When I saw him he had had a lot of trouble with his equipment and methods and was quite discouraged. Their production was about 4,000 in 1936, but it has been larger—more than 5,000, in other years.

Maryland Methods

I am indebted to Mr. E. Lee LeCompte, State Game Warden of Maryland, for showing me their quail rearing facilities and methods at the Gwynnbrook State Game Farm No. 1, and for other courtesies. They also have another game farm, the Wicomico State Game Farm No. 2, where some quail are reared in confinement for stocking purposes. Several thousand quail are reared every year on these two farms and in addition, they purchase birds from private breeders. Here is a splendid example of cooperation instead of competition of the state authorities with private enterprise.

The methods employed are similar in general to those used by Mr. Coleman and were brought to their attention in 1929 by Mr. Edwin G. Baetjer, of Baltimore, owner of White Oak Quail Farm, where the Coleman methods were being developed and put to practical application.

New brooder house and outside runs. Georgia State Quail Hatcheries.
Courtesy J. P. Collins, Manager.

Quail Rearing Pens. The best new movable type. Illinois State Quail Farm.
Courtesy L. E. Martin, Superintendent.

At Gwynnbrook there is a large brooder-house for quail in which temperature and moisture can be controlled within satisfactory limits. Within this house are many brooder pens of special design. They have the wire bottoms for the runs so the droppings can go through and a warm brooding compartment with warm-water heating equipment.

The laying pens were designed by the Superintendent, Mr. C. J. McPhail, and are known as the McPhail laying pen. They are 3 feet wide, 8 feet long, twenty inches high and are held 2 feet above ground on legs. The frame of the pen is covered with wire, except for an enclosed compartment, with slanting roof, at one end, for feeding equipment, nests, etc. After all, the same general principles are followed here as at other quail farms. The holding pens are wider, enclosed around the bottom and not so high from the ground.

Georgia has a new state quail farm out a few miles from Atlanta. They have been feeling their way along for two or three years but with P. W. A. help have just completed a very modern plant for the 1937 season. The same general principles are followed. They had about 2,500 quail at the time of my visit last fall.

A standard make of forced draft incubator is used and the records which Mr. J. P. Collins, the Superintendent, showed me indicate the highest percentage of hatches (mostly above 95%) I know of anywhere. He is a man of unusual inventive genius and, although the new brooder house was only just well started when I saw it, I would expect it to be very efficient. It consists of a long house wih inside brooder pens and other facilities, and with outside runways or sun-porch pens. They will probably be able to produce large numbers of quail there this year.

Indiana has a very large state game farm near Medaryville, where several varieties of wild game birds are propagated in confinement in large numbers, including bobwhites which are reared by the hundreds and thousands. I am indebted to Mr. H. P. Cottingham, Superintendent of Game, for courtesies and information about the methods employed.

Although the general principles relative to incubation and the laying and holding pens are the same as found elsewhere, the brooding system and equipment are different. They have specially constructed small two-compartment brooder houses built on the ground, with capacity for 200 quail chicks. Each compartment is equipped with a separate special electric brooder. The floors are covered with about one inch of either peat moss or wood shavings which are renewed frequently during the six weeks period the birds are kept in this house. I am sure better methods will sooner or later replace their brooding method but the fact is that they are getting good results now and no doubt will be slow to give it up.

When I visited this farm the past Winter, they were building more equipment for quail rearing to provide for contemplated expansion. The entire farm gives one the impression of expert and efficient supervision and management, the kind that generally results in success.

Illinois

Illinois has a well organized and efficiently operated quail hatchery, located on the Fair Grounds in the suburbs of Springfield, the State Capital. Their production in 1936, was about 5,000. In addition, they are rearing large numbers of Hungarian partridge and experimenting a little with prairie chicken.

They use small brooder houses very similar to those at the Indiana Hatchery. Their equipment and methods are also similar.

The feature at this hatchery that impressed me most was the laying pens. I did not get to see Mr. L. E. Martin, the Superintendent, and, therefore, did not get the exact measurements and description of these pens. They impressed me as being far the best I have seen or have heard of anywhere. I was so impressed that I would advise anybody who contemplates building laying pens to get more definite information about these particular pens—before he builds.

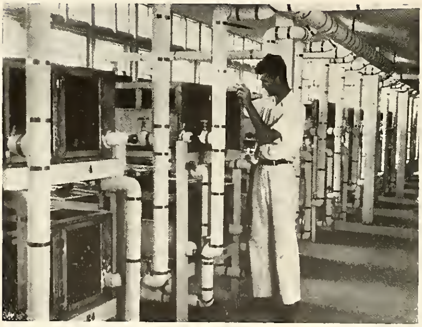
A very brief description from memory only, is sure to be inaccurate, but it may give the general idea. The sides of the pens are made of 12 inch boards about 6 feet long. A board partition runs down the middle, making a unit of two pens about 2 by 6 feet each, one foot deep, with wire bottom and top. The unit is raised on four legs about 3 feet off of the ground. A hinged board at one end covers the feed and water compartment and one at the other end, the nest. These boards slant enough to shed rain.

The Tennessee State Game Commission's Quail Hatchery, at the Buffalo Springs Fish and Game Preserve, some 15 miles south of Morristown, is on the largest scale of any I have heard of yet. They raised over 11,000 bobwhites in 1936, and I was told that their goal for 1937 was 60,000.

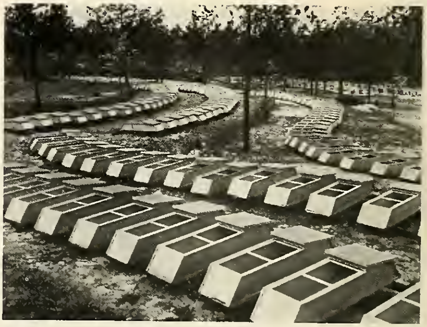
The extensiveness of the plant may be indicated by a brief general description of the brooder houses that were under construction at the time of my visit last November.

There are five brooder houses, each 14 feet wide by 126 feet long. They are located parallel to each other, about 25 feet apart, and all five are joined together by another long building across the end. These brooder houses have concrete floors with a walkway down through the middle and about 3 feet lower than the brooder pen floors, which are also made of concrete. The concrete floor also extends on the outside about 6 feet.

There are brooder pens about 4 by 4 feet on the inside of the house so arranged that they can be lifted up and fastened against the wall out of the way when the floors are cleaned. There are corresponding outside wire pens about 4 by 6 feet where birds can be kept out in the sun and fresh air as desired. This same feature was noted at the new



Interior of brooder-house showing specially designed Loyd Mitchell Brooders for quail. Maryland State Game Farm.



Laying pens. Georgia State Quail Hatcheries.
Courtesy J. P. Collins, Manager.

A tray of quail chicks just hatched out. Indiana State Game Farm.
Courtesy H. P. Cottingham, Superintendent.

A field of quail breeding pens. Indiana State Game Farm.
Courtesy H. P. Cottingham, Superintendent.

brooder house which I saw under construction at the Georgia Hatchery.

If they succeed with this gigantic plant, they ought to raise a great many quail. The Superintendent, Mr. J. T. Tomlinson, is a keen, wide-awake young man and he will have an opportunity to show what can be done with this kind of equipment and the methods for which it is intended.

Our own Louisiana State Quail Hatchery is located adjacent to the Huey P. Long Fish Hatchery, at LaCombe. It is on a somewhat smaller scale but has modern equipment and facilities, well handled. They got started late in the season last year and had difficulty in securing breeding stock and eggs. This year there will be about 200 pairs of breeders, many of them already laying now and there is good prospect for larger production from now on. There should be a good many birds from this hatchery for distribution at the proper time.

Now that bobwhites are being raised for restocking purposes in large numbers all over the country we should soon learn whether such restocking is worthwhile and can actually contribute much to the abundance of these fine game birds in the vast territory to which they are adapted.

*Note: Several manufacturers of incubators now offer machines for hatching quail eggs.

Louisiana Take of Fur Animals in 1936

Louisiana's take of fur animals in 1936 was as follows: muskrats, 2,100,500; opossums, 125,830; raccoons, 84,321; minks, 82,463; otters, 650; skunks, 45,947; miscellaneous pelts, 2,503. A rough estimate of the total value of these pelts at the source was $2,500,000.

Co-operation of Federal and State Officials

The Department was represented by Messrs. Armand Daspit and J. B. Dauenhauer, Jr., at the game conference of Federal officials and Southern states commissioners held in Montgomery, Alabama, April 20th and 21st.

The Louisiana delegates were cordially received, especially by the Federal officials who seemed to recognize Louisiana as the foremost state in matters pertaining to conservation. There was a discussion of the advisability of increasing the bag limit on geese and early dove shooting.

Messrs. Daspit and Daunhauer reported that the meeting paved the way for a closer and more agreeable relationship between the Federal and state officials.

Pair of breeders in laying pen. Indiana State Game Farm.

Bobwhites in holding pen. Indiana State Game Farm.
Courtesy H. P. Cottingham, Superintendent.

Geological Survey

DR. H. V. HOWE, Director,
School of Geology of Louisiana State University
and Director, Research Division, Louisiana
Geological Survey

C. K. MORESI, State Geologist,
Louisiana Geological Survey,
Department of Conservation

The geological study of Winn and Caldwell Parishes, which has been in progress since June 1, 1936, is being continued in the field this summer. Mr. Huner, the geologist in charge, plans to make a detailed study of Caldwell Parish.

Approximately 150 samples containing microfauna from the Cook Mt. formation, which were collected during the previous field season in Winn Parish, have been studied in the laboratory at the Geological Survey. The work has shown that certain foraminifera are characteristic of three definite zones in the Cook Mt. formation. This will prove useful in establishing the depth and correlation of oil bearing horizons associated with the Cook Mt. formation in Louisiana. The complete microfauna found in this formation will be described and illustrated by Dr. H. V. Howe in a bulletin to be completed some time next fall.

Cook Mt. Formation

A study of the strata exposed in the Cook Mt. formation has revealed that there are two definite lithologic horizons that may be traced across Winn Parish. One of these, a marl in the Milams member containing at the surface indurated argillaceous limestone concretions; the other, a very fine clay almost bentonitic in appearance, occurring above the type section of the St. Maurice member. Thin sections will be made of the latter to determine its true identity. It has also been found that at least 40 feet of strata overlying the St. Maurice section are fossiliferous and belong to the Cook Mt. formation.

A structure map is now being constructed which is based on data obtained from various wells drilled throughout the parish. Structure contours will be drawn on the contact of the Cane River and the Wilcox formations, the same horizon from which the production of oil is obtained in the Tullos-Urania field, located in the southeastern corner of Winn Parish. This map will be helpful in indicating likely structures that may produce oil in other parts of Winn Parish.

The various salt domes located in Winn Parish have been studied and maps and cross sections showing the characteristics of these domes have been constructed. Some 14 test cores taken from the cap rock in the Winnfield rock quarry have been examined and the occurrence of limestone and anhydrite noted and included in a cross section of the dome. At the Winnfield salt mine the structure and the characteristics of the salt and anhydrite were determined. It was found that the salt, after being "shot in", had a temperature of 72° F. A test hole was found in the mine from which brine was flowing. The brine was apple green in color and M. C. Mann, chemist at the salt mine, reported that no ferric ions were present. It first flowed under a pressure of 225 pounds. It may be that this is the "mother liquor" of the salt. Data on the dip of the anhydrite bands in 8 test holes was obtained and will give some clue to the structure of the salt at depths below mine level. In the mine the dark anhydrite bands in the salt were found to be highly compressed and folded similar to the structure in the salt found in mines in South Louisiana.

Work in Caldwell Parish this summer will proceed along lines similar to those employed in Winn Parish. Definite lithologic and faunal horizons, whose surface irregularity may indicate favorable structures for the production of oil, will be sought for. Correlations will be made that will indicate the feasibility of drilling to horizons which are now producing in other parts of the state. Other natural resources will be investigated with a view to their economic utility.

Fuller's Earth

A deposit of fuller's earth has been discovered near Bogalusa, Washington Parish.

The United States Bureau of Mines defines fuller's earth as follows: "Fuller's earth is a mineral substance resembling clay, with physical properties that give it a high capacity for removing basic colors from solution in mineral, vegetable, or animal oils. The name does not imply any particular chemical composition but was derived from the use to which the earth was formerly put by fullers to full or scour and cleanse cloth of grease and by furriers to remove grease from fur . . ."

Fuller's earth is used extensively for bleaching, clarifying, decolorizing, or filtering vegetable oils, animal fats, mineral oils and tung oil. Most of the domestic fuller's earth comes from Georgia and Florida. The domestic production of fuller's earth in the United States does not supply the domestic market. Fuller's earth is imported from the United Kingdom, Japan and Germany. Large quantities of similar material is being mined in Mississippi for use as a rotary mud in the drilling of oil, gas, and other deep wells.

Material from a portion of this deposit has been used for a number of years by the BoniFacial Incorporated in the preparation of certain types of cosmetics. Recently samples of this material were sent to a number of laboratories for determination and tests. The material was identified as fuller's earth.

Samples of animal fats, tallow, cotton seed oil, tung oil and automobile lubricating oil, which had been used in a car for 750 miles, were filtered through samples of the Bogalusa fuller's earth. These tests showed that this fuller's earth was a good bleaching agent.

This fuller's earth may be very useful in the filteration and clarifying of tung oil. Thousands of tung oil trees have been planted in the

Bogalusa area and this material will probably be used extensively in the clarifying and filtering of this material.

Dr. Chalmer J. Roy of the School of Geology of Louisiana State University has visited the deposits and reports that some of them are favorably located, and may prove large enough for commercial production. Dr. Roy will begin a survey of the geology of Washington and St. Tammany Parishes in August, 1937. This survey will include a more detailed examination of the clay deposits and their commercial possibilities.

Dr. P. G. Nutting of the United States Geological Survey, Washington, D. C., who is an authority in evaluating the various uses of fuller's earth has kindly offered to make certain tests with samples of fuller's earth from this deposit. Report of his laboratory tests will appear in the forthcoming issue of the Conservation Review.

Studies of Cap Rock and Rock Salt of Salt Domes Will Be Continued During the Summer Months

Mr. Ralph E. Taylor will remain at the School of Geology, Louisiana State University, during the summer months, in order to complete the studies which he is making of the cap rock and rock salt of the Louisiana salt domes. The large collection of salt dome materials which has been assembled by the Louisiana Geological Survey through the cooperation of the salt, sulphur and oil companies operating in Louisiana has made possible considerably more extensive studies than were originally anticipated.

Petrographic analyses of thin sections and of the water-in-soluble residues of the rock salt have revealed the presence of distinctive mineral assemblages, comparable in their complexity to those of the German salt plugs. The assemblages of different salt plugs have in general the same composition, but certain of them are characterized by quite distinctive minerals. At present petrographic analyses are being made of cap rock which overlies the salt plugs carrying distinctive minerals in order to learn whether these distinctive minerals are also present in the cap rock. If a relationship of this kind between the salt plug and cap rock can be established, it will constitute evidence that the cap rock has been formed through accumulation of water-insoluble residue in the rock salt.

The Succulent Oyster Travels Inland

(Continued from Page 8)

a splendid crop will be harvested from these localities.

Legislation has been enacted in Louisiana making it possible for new factories to buy land, erect plants and be exempt from state property tax for a period of ten years. Ideal locations for factory sites may be found in all of the coastal parishes.

New canals have been recently completed by the Parishes of Plaquemines and St. Bernard, in close proximity to thousands of acres of natural reef oysters. These canals were built for the express purpose of affording suitable factory sites on high land where an abundance of labor is available at all times.

New Factories

Several factories have shown considerable interest in obtaining locations in Louisiana before the beginning of the next oyster season, and a new factory has already been established at Pointe a la Hache, which should enjoy a successful season during the coming winter. Another factory has been completed at Delcambre, in Iberia Parish; it has been operating very successfully on oysters obtained from a large new reef recently discovered in the Gulf of Mexico, a few miles southwest of Southwest Pass, in Vermilion Parish.

Mr. McConnell recently returned from a tour of inspection of this reef and was impressed by the quality and quantity of oysters found there.

A new sea-food company whose operations will be based on fundamental principles entirely new to this state is now being organized—it should be a pioneer in a more modern and efficient sea-food industry in the South.

Nature Guardians

Edited By ESTELLE V. COTTMAN

DEAR GUARDIANS:

We are in the midst of the great American camping season—the time when nature lovers leave the crowded cities and pitch their tents as far as possible from the scenes of everyday life; when *pater familias* takes down his favorite fishing rod and polishes it off; when mother begins to assemble her oldest dishes and cooking utensils in readiness for the trip; and the children are so excited they can hardly wait for the day of departure.

The experienced camper knows just how to select the right spot for his tent. He sees that the water supply is pure and accessible, that there is the right amount of shade and sunshine, that the bathing place is safe and convenient and that there is a sheltered site where he can build his fire.

If he is wise he does not build too large a fire, especially when there is a strong wind that might carry sparks over dry underbrush. He does not build it too near the tent, or near inflammable trees. He makes sure that the fire will not spread by circling it with stones, or with fresh earth or wetting the ground around it.

He is sure that every spark is out before leaving camp. He pours water over it and around it, and then, if he is a good conservationist, he may even tamp the spot heavily or smother the ashes with fresh earth. He realizes that often a strong wind will kindle anew embers that show no signs of life. He knows that carelessness of campers often results in terrible forest fires.

I hope my Guardians who camp in our beautiful forests this summer will remember to be careful with fire. Louisiana has been blessed with an abundance of pines and hardwoods and we must take every dize them. I hope, too, that my Guardians will not forget that we are trying to conserve our wild shrubs and flowers, and will discourage their wanton destruction by campers and hikers.

—THE EDITOR.

—Henry E. Belden Photo

Do you believe in pictures?

If you are a sportsman, whether you use the old-fashioned pole or rod and reel, you will get a thrill out of the fight this game tarpon is making for his life, in the blue waters of the Gulf, across Barataria Bay.

And are they biting now! Within a few hours of New Orleans, metropolis of the South, by auto and boat, the fisherman finds himself in the land of his dreams. In lakes and rivers, bayous and canals, perch, croakers, barfish and catfish, striped bass and green trout; in the saltier waters of the lakes and marshes adjoining the Gulf redfish, sheepshead, speckled trout, drum, flounder and white trout, to say nothing of the far from beautiful but delectable crab.

The sportsman seeking a real fight for his money will get it around Grand Terre and Grand Isle, in the inlets and sounds of the Louisiana Coast—bull redfish, sheepshead and speckled trout; king mackerel and tarpon. Here has been set the world's record for the number of tarpon caught by one man in a specified length of time.

Throughout the State of Louisiana the lakes and streams are constantly replenished by stock from the state hatcheries, in pursuance of the policy of the Conservation Department to retain for Louisiana its reputation as the Sportsman's Paradise.

Wherever you may be, in whatever part of the globe, you will find no more exciting sport than is to be obtained in the waters of Louisiana.

Detailed information as to the fish and game laws of the state, licenses, etc., may be obtained by writing to—

DEPARTMENT OF CONSERVATION
126 NEW COURTHOUSE BLDG.,
New Orleans, La.

Minerals Division

Department of Conservation

Louisiana's Mineral Production for the 1st Quarter of 1937

OIL	
	Barrels
North Louisiana .	6,129,286
South Louisiana .	15,196,398
Total	21,323,684
NATURAL GAS	
	Cubic Feet
North Louisiana .	78,679,769,000
South Louisiana .	6,164,542,000
	Gallons
NATURAL GASOLINE . (Extracted from natural gas)	23,586,260
SALT	
	Short Tons
Rock Salt.......	120,074
Salt in brine....	101,661
	221,735
	Long Tons
SULPHUR	53,915

Gibson Oil Field
Terrebonne Parish

Another oil field was added to the list of producing fields in South Louisiana when the Shell Petroleum Corporation completed their well, Realty Operators No. 1-B in Section 18, Township 17 South, Range 15 East, Terrebonne Parish. The well was completed on February 20th flowing 963 barrels of 37.8 degrees gravity oil through a 1/4 inch choke from a total depth of 9493 feet, with a tubing pressure of 1700 pounds and a casing pressure of 1675 pounds. The well also made about 800,000 cubic feet of gas.

This field was the second deepest producing oil field in the State when this well was completed. In the Lafitte field of Jefferson Parish, oil is being produced below the 10,000 ft. level (The newly discovered Lirette oil field is producing below the 12,000 ft. level).

Lisbon Oil Field
Claiborne Parish

The Lisbon oil field which is located in the southeastern part of Claiborne Parish and northwest corner of Lincoln Parish is the most important oil discovery in North Louisiana since the discovery of the Rodessa field, about two years ago.

As a result of oil seepages from an abandoned well which has been drilled to a depth of 6170 feet in Sec. 13, T 21 N, R 5 W, in 1934, and a geophysical survey of the area by H. D. Easton, et al., drilled the well Patton No. 1 in Sec. 1, T 20 N, R 5 W. After encountering many difficulties, such as having the derrick blown down and abandoning the first hole at a depth of 4232 feet, the second well Patton No. 2 was completed on December 21, 1936, at 550 barrels of 34.8 gravity oil a total depth of 5379 feet, making through a 1/4 inch choke, with tubing pressure of 500 pounds and casing pressure of 300 pounds.

Four wells began drilling immediately following this discovery, two of which were completed in March. At the end of March three wells were producing and three additional wells were drilling.

Harang Oil Field
Lafourche Parish

In January, 1937, a new oil field, the Harang field, was discovered in Lafourche Parish. The discovery well was completed at a total depth of 6977 feet, and flowed about 515 barrels of 35 degrees gravity oil through a 1/4 inch choke, with a tubing pressure of 330 pounds and a casing pressure of 700 pounds.

Prior to the drilling of this well by the Pan-American Production Company, the Barnsdall Oil Company drilled three wells in this area in 1934 and 1935. The first well encountered salt at a depth of 6975 feet, thus proving the existence of a salt dome. The second well was abandoned without reaching salt; while the third well encountered salt at a depth of 6586 feet and was abandoned.

The Pan-American Producing Company completed a second in March, 1937. This well, located near the first producer, and east of the wells drilled by the Barnsdall Oil Company, came in flowing 482 barrels of oil daily. A third well was drilling during the latter part of March.

Jennings Oil Field
Acadia Parish

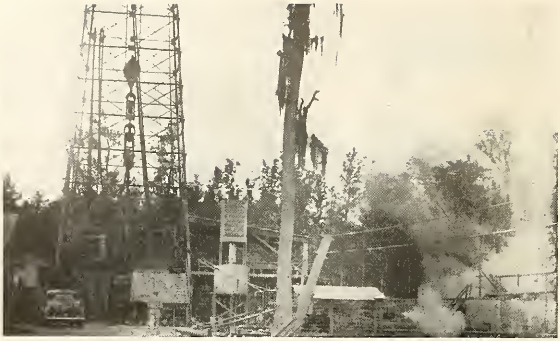
One of the most prolific oil sands in South Louisiana was discovered on the southwest flank of the old Jennings oil field of Acadia Parish in the latter part of 1936. During the first three months of 1937, two wells were completed on the southwest flank of this dome. The Superior Oil Company completed the well, Jennings-Heywood No. 1, in January, flowing 486 barrels of oil daily through a 12/64 inch choke. Another well was completed in March flowing 804 barrels of 38 degrees gravity oil daily through a 14/64 inch choke from a total depth of 6490 feet. In the latter part of March, there were seven deep wells drilling on the southwest flank of the dome.

Special Regulations for the Sligo Oil and Gas Field

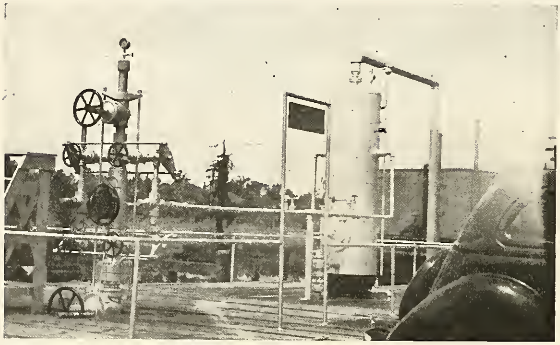
The Sligo oil and gas field, located about 12 miles southeast of Shreveport, in Bossier Parish, has possibilities of being one of the major oil fields of North Louisiana. Gas has been produced from this field for a number of years, however, oil was not discovered until 1936. The discovery well which is located on the southwest flank of the field, flowed 175 barrels of oil daily from a depth of 5196 feet. The oil is obtained from the Petitt sand of Lower Glen Rose Age. A second oil producer was completed in November, 1936, flowing approximately 53 barrels daily.

During the first three months of 1937, two oil wells were completed with a total initial daily production of 440 barrels of oil and four gas wells were completed, having a total open flow capacity of about 110 million cubic feet of gas.

On February 26, 1927, the Department of Conservation issued order No. 8, providing special rules and regulations governing the pro-



View showing the drilling of the second well in the Gibson field, Shell Petroleum Corporation, Pelican No. 1, located about 1000 feet northeast of the discovery well, in Section 186, T 17 N, R 15 E, Terrebonne Parish.



View of the Shell Petroleum Corporation's well, Realty Operators No. B-1, discovery well of the Gibson field, Terrebonne Parish. Showing well producing with complete equipment.

Barges in Bayou Black into which oil from the Gibson field is being loaded for shipment by water. The field is located a short distance south of this bayou, a navigable stream, which connects with the Intracoastal Canal. About three miles south of this field is the Intracoastal Canal. The oil is transferred from the oil field to the barges in the bayou by pipe line. On right is shown paved U. S. Highway 90.

duction of oil from the Sligo field. These special rules and regulations were issued for the purpose of conserving the oil and gas resources of this field and to prevent the waste and depletions by regulating the production of crude oil and natural gas and the use of any method whereby surface waste or underground waste may result. The order states that: "It is further the purpose of these rules and regulations to protect the interests of the State of Louisiana, to prevent waste by controlling withdrawals, and by other means, so as to afford to the producer of each property in the common source of supply the opportunity to produce his just and equitable share of the oil, with due regard to the productivity of his property and wells, so far as it can be practically obtained without waste, and for this purpose, to use his just and equitable share of the reservoir energy."

This order consisting of 16 pages set down rules and regulations under the following section headings: Drilling and completion; Production and Equipment; Allocation of Production; Nomination and Allotment of Acreage; Determination of Bottom Hole Pressures; Gas-Oil Ratios; and other conservation regulations.

This order was promulgated after a public hearing was held at New Orleans on February 12, 1937.

Two Salt Domes Discovered in South Louisiana

In January, 1937, William Helis' well, Marchland No. 1, located on the Marchand geophysical prospect in Section 19, Township 23 south, Range 23 East, Lafourche Parish, encountered salt at a depth of 7,465 feet, thus proving another salt dome for the Louisiana Coast.

The Texas Company's well, St. Martin Land Company No. 9, located on the Henderson geophysical prospect of St. Martin Parish, encountered salt at a depth of 8848 feet in March, 1937. Prior to the discovery of this salt dome, The Texas Company had drilled four wells in this area, which were abandoned at depths of 9771 feet, 8986 feet, 8205 feet, and 8871 feet, respectively.

Oil and Gas Wells Completed in North Louisiana During First Quarter of 1937

Field	Name of Company	Name of Well	Date Completed	Initial Daily Production	Size Choke	Grav-ity	Total Depth Feet
Bear Creek (Bienville Parish)	Seaboard Oil Co. (Gas)	McGee #1	3/5/37	*65 MCF			6,704
Bistineau (Bienville Parish)	De Soto Oil & Gas Co. (Gas)	Dunn & Olsen #1	1/5/37	20 MCF†			5,236
Bull Bayou (Red River & De Soto Parishes)	Gulf Refining Co.	L. E. Kennedy #25	2/5/37	30 Bbls.	Pump		2,550
	Gulf Refining Co.	Jenkins "A" #36	3/23/37	7 Bbls.	Pump	41.1	2,453
	W. T. Coleman (Gas)	Taylor #1	1/8/37	1½ MCF			872
Converse (Sabine Parish)	W. G. Ray Drilling Co.	Looney #2	3/15/37	100 Bbls.			2,080
	Power Oil Co.	Belton #1	3/15/37	150 Bbls.			1,709
	Producers Oil & Gas Co.	Edwards #4	3/15/37	80 Bbls.			1,740
Cotton Valley (Webster Parish)	Ohio Oil Co. (Distillate)	Bodcaw #1	1/11/37	256 Bbls. & 4 MCF	1/4"		8,188
	Woodley Petroleum Co. (Gas)	R. R. Cox B-#2	2/1/37	23 MCF			5,557
	Magnolia Petroleum Co.	Ira Cox #5	2/14/37	504 Bbls.	3/16"		8,635
	United Gas Co. (Gas)	Mixon #2	3/25/37	127 Bbls.	1/2"	62.7	8,231
Driscoll (Bienville Parish)	Lide, Greer & Brown	Smelley #1	3/23/37	14½ MCF			7,350
Georgetown (Grant Parish)	Kirby & Beasley	Maxwell #1	1/10/37	5 Bbls.			1,540
	Graham, et al.	Swope #1	1/31/37	20 Bbls.			1,609
Lisbon (Claiborne Parish)	Ray P. Oden & Evans, et al.	H. E. Patton #1	3/25/37	576 Bbls.	3/4"	34.8	5,375
	Lyons & Neeley	H. E. Patton #1	3/29/37	840 Bbls.	1"	34.8	5,292
Monroe (Ouachita, Morehouse and Union Parishes)	Hope Production Co. (Gas)	Cole #7	2/3/37	3 MCF			2,162
	Hope Producing Co. (Gas)	Cole #6	1/9/37	3 MCF			2,160
	S. D. Hunter Trustee (Gas)	Allison #11	1/16/37	1 MCF			2,210
	S. D. Hunter Trustee (Gas)	Allison #12	1/6/37	1½ MCF			2,217
	Interstate Natural Gas Co. (Gas)	Fee #61	1/15/37	15 MCF			2,171
	Interstate Natural Gas Co. (Gas)	Fee #62	1/19/37	25 MCF			2,181
	Interstate Natural Gas Co. (Gas)	Fee #56	2/8/37	8 MCF			2,387
	Southern Carbon Co. (Gas)	Grayling #16	1/20/37	13 MCF			2,128
	United Carbon Co. (Gas)	Smith #2	2/2/37	2 MCF			2,187
Pine Island (Caddo Parish)	Stanolind Oil & Gas Co.	Dillon #116	2/24/37	30 Bbls.	Pump		1,695
	Stanolind Oil & Gas Co.	Dillon #117	3/2/37	50 Bbls.	Pump	36.0	1,683
	Stanolind Oil & Gas Co.	Dillon #118	3/10/37	100 Bbls.	2"	35.0	1,677
	Stanolind Oil & Gas Co.	Dillon #119	3/27/37	65.00	(?)	36.0	1,675
Rodessa (Caddo Parish)	Phillips Petroleum Co.	Interstate #2	1/1/37	400 Bbls.	1/4"		6,129
	R. W. Norton	W. Starcke #2	1/11/37	396 Bbls.	1/4"		6,005
	United Gas Pub. Serv. Co.	W. H. Mitchell #3	1/20/37	624 Bbls.	3/8"		5,930
	Standard Oil Co. of La.	J. R. Hardin #1	1/20/37	907 Bbls.	25/64"		6,004
	Phillips Petroleum Co.	Rosa H. McDonald #3	1/20/37	298 Bbls.	5/32"		6,150
	United Gas Pub. Serv. Co.	Brewer Unit #6	1/24/37	128 Bbls.	1/4"		6,005
	Arkansas Louisiana Gas Co.	J. S. Teamer #2	1/28/37	101 Bbls.	1/2"		6,084
	United Gas Pub. Serv. Co.	Fee 574 #5	1/22/37	888 Bbls.	3/8"		5,988
	Magnolia Petroleum Co.	Norton Levee Board #10	1/29/37	792 Bbls.	1/4"		5,997
	Magnolia Petroleum Co.	J. W. Foscue #7	2/4/37	528 Bbls.	3/8"		6,003
	Magnolia Petroleum Co.	Caddo Levee Board #A-12	2/9/37	528 Bbls.	3/16"		5,980
	United Gas Pub. Serv. Co.	Stevens #1	2/16/37	528 Bbls.	1/4"		6,018
	J. E. Jones	Madie Z. Sharp #B-1	3/1/37	1,176 Bbls.	3/4"		6,045
	Standard Oil Co.	Emma J. Parker #1	3/6/37	600 Bbls.	3/8"		6,013
	R. W. Norton	Walter Starcke #3	3/7/37	216 Bbls.	1/4"		5,994
	United Gas Pub. Serv. Co.	W. H. Mitchell #4	3/13/37	504 Bbls.	3/8"		5,935
	Standard Oil Co. of La. and Gulf Refining Co.	J. R. Hardin #2	3/13/37	672 Bbls.	25/64"		5,988
	United Gas Pub. Serv. Co.	Carrie Mitchell #A-1	3/15/37	576 Bbls.	3/8"		5,910
	Standard Oil Co. of La.	Armistead Community #1	3/20/37	504 Bbls.	25/64"		6,025
	R. W. Norton	L. C. Hardin #1	3/20/37	480 Bbls.	1/4"		5,930
	Standard Oil Co. of La.	Armistead Community #2	3/24/37	109 Bbls.	(?)		6,039
	United Gas Pub. Serv. Co.	Rodessa O & L Co #27	3/31/37	78 Bbls.	12/64"		5,993
	Lion Oil Refg. Co. (Gas)	J. M. Wynn #7	1/5/37	43 MCF			6,065
	Potter & Jones (Distillate)	J. T. Means #1	3/1/37	98 Bbls. & 5 MCF	1/4"		5,955
Sligo (Bossier Parish)	Arkansas Louisiana Gas Co. (Gas)	Poggie Potter #1	1/26/37	25 MCF			4,312
	Arkansas Louisiana Gas Co. (Gas)	W. H. Davis #1	2/17/37	33 MCF			5,225
	Triangle Drilling Co. (Gas)	H. L. Skannal #I-1	2/18/37	15 MCF			5,170
	United Gas Public Service Co. (Gas)	H. C. Freedman #1	2/20/37	20 MCF			5,103
	United Gas Public Service Co. (Gas)	A. C. Skannal #H-1	2/24/37	240 Bbls.	7/64"		5,144
	Producers Oil & Gas Co. (Gas)	Edwards Estate #1	3/11/37	50 MCF			5,184
	Arkansas Louisiana Gas Co. (Gas)	R. Hardeman #1	3/19/37	26 MCF			4,324
	Triangle Drilling Co.	Skannal #H-1	3/27/37	200 Bbls.			5,166
Sibley (Webster Parish)	Standard Oil Co. of La. (Distillate)	Fudicker #1	3/31/37	57 Bbls. & 13 MCF			5,600
Sugar Creek (Claiborne Parish)	United Gas Public Service Co. (Gas)	R. Simms #1	2/14/37	60 MCF			5,714
Urania (LaSalle Parish)	Arkansas Fuel Oil Co.	Urania #B-13	1/16/37	300 Bbls.			1,518
	Arkansas Fuel Oil Co.	Urania #B-14	1/29/37	50 Bbls.			1,524
	Air Lift Oil Co.	Urania Lbr. Co. #2	3/27/37	20 Bbls.			1,523

*MCF means million cubic feet of gas—the open flow capacity of a gas well when tested for 24 hours. †Estimated.

Oil and Gas Wells Completed in South Louisiana During First Quarter of 1937

Field	Name of Company	Name of Well	Date Completed	Initial Daily Production Bbls.	Size Choke	Grav-ity	Total Depth Feet
Basile (Acadia Parish)	Continental Oil Co.	Ozeman Young #1	1/6/37	429.60	1/4"	35.6	8,318
	Continental Oil Co.	Homeseekers Dev. Co. #A-10	1/22/37	454.44	1/4"	33.6	8,320
	Continental Oil Co.	Homeseekers #A-11	2/10/37	519.36	1/4"	36.0	8,318
	Continental Oil Co.	P. O. Johnson #2	2/18/37	672.12	1/4"	36.4	8,317
	Continental Oil Co.	P. O. Johnson #3	3/13/37	558.00	1/4"	35.2	8,323
	Continental Oil Co.	P. W. Miller #3	3/24/37	192.00	5/32"	37.0	8,313
	Continental Oil Co.	M. F. Ortego #1	3/25/37	204.00	5/32"	37.6	8,317
Caillou Island (Terrebonne Parish)	The Texas Co.	State Caillou Island #31	1/7/37	1,018.00	3/8"	37.8	5,154
	The Texas Co.	State Caillou Island #28	2/14/37	755.00	3/8"		4,582
	The Texas Co.	State Caillou Island #33	2/23/37	416.00	1/4"	24.9	4,348
	The Texas Co.	State Caillou Island #46	3/17/37	1,156.00	3/8"	37.9	4,924
Cankton (St. Landry Parish)	Superior Oil Co. (Limited Oil Co.)	Adolph Savoie #1	1/10/37	43.20	1/4"	28.7	6,676
	Superior Oil Co.	Adolph Savoie #2	2/25/37	9.00	20/64"	33.5	6,588
Charenton (St. Mary Parish)	Pan American Production Co. and Mike Hogg, et al.	Laws Realty #2	2/23/37	649.20	1/4"	37.2	7,194
Darrow (Ascension Parish)	Humble Oil & Refg. Co.	Humble Community #14	2/14/37	581.00	1/4"	34.7	5,613
Dog Lake (Terrebonne Parish)	Texas Co.	LLE Dog Lake #14	3/19/37	1,300.00	3/8"	38.8	6,894
East Hackberry (Cameron Parish)	Gulf Refining Co.	M. P. Irwin "A" #22	1/12/37	648.00	1/4"	31.8	6,190
	The Texas Co.	State #20	3/12/37	800.64	1/4"	38.4	6,490
English Bayou (Calcasieu Parish)	Fohs Oil Co.	A. D. Daharsh #1	1/16/37	214.68	13/64"	42.4	7,051
	Union Sulphur Co.	Mary McIver #1	2/26/37	624.00	1/4'	35.4	5,431
	Fohs Oil Co.	Castle #17	3/8/37	615.60	1/4'	42.4	7,046
Jennings (Acadia Parish)	Superior Oil Co.	Jennings-Heywood #1	1/1/37	486.00	12/64"	39.8	6,746
	Superior Oil Co.	Iowa-Jennings #1	3/8/37	804.00	14/64"	38.0	6,498
Garden Island Bay (Plaquemines Ph.)	The Texas Co.	State Garden Island Bay #20	1/1/37	292.00	3/8"		4,639
Gibson (Terrebonne Parish)	Shell Petroleum Corp.	Realtors Operators #B-1	2/20/37	963.00	1/4"	37.8	9,493
Gillis (Calcasieu Parish)	Union Sulphur Co.	Bel #2	1/14/37	300.00	1/4"	38.5	8,290
	Union Sulphur Co.	Powell Lumber #11	2/4/37	224.64	1/4"	34.6	6,673
	Union Sulphur Co.	Barbe #13	3/14/37	436.80	1/4"	36.7	6,735
Harang (Lafourche Parish)	Pan American Production Co.	Harang #2	3/12/37	482.00	1/4"	33.6	6,962
Iberia (Iberia Parish)	The Texas Co.	Louis P. Bryant #2	1/3/37	581.04	1/4"	28.2	4,102
	Canal Oil Co.	Bernard #5	1/15/37	536.52	1/4"	25.5	4,607
	The Texas Co.	H. C. Haaszen B #3	2/5/37	578.88	1/4"	26.7	5,034
	Canal Oil Co.	Bernard #6	2/15/37	583.20	1/4"	25.5	4,562
	The Texas Co.	H. C. Haaszen B #4	2/20/37	603.00	1/4"	24.8	4,755
	The Texas Co.	J. P. Duhe, et al. #1	3/19/37	844.00	1/4"	25.8	4,794
	Canal Oil Co.	Bernard #7	3/26/37	567.72	1/4"	25.4	4,769
Iowa (Calcasieu Parish)	Shell Petroleum Corp.	F. Heyd #22	3/20/37	550.00	16/64"	26.5	4,432
Jeanerette (St. Mary Parish)	Herton Oil Co.	Refus Banta #6	1/26/37	570.84	1/4"	36.5	6,665
	Herton Oil Co.	Carter #4	2/4/37	791.68	1/4"	39.0	7,046
	Herton Oil Co.	Rufus C. Banta #7	2/17/37	767.20	1/4"	36.8	6,651
	Herton Oil Co.	W. J. Carter #5	3/20/37	464.52	7/32"	37.3	7,054
	Herton Oil Co.	Barrileaux #2	3/27/37	555.36	7/32"	36.6	6,670
Lafitte (Jefferson Parish)	The Texas Co.	Rigolets Coop. Fur Co. #5	1/6/37	1,606.00	3/8"	34.6	10,110
	The Texas Co.	R. C. Milling, et al. #1	1/12/37	1,543.00	3/8"		10,022
	The Texas Co.	Rigolets Coop. Fur. Co. #6	3/18/37	1,394.00	3/8"	37.4	9,476
Leeville (Lafourche Parish)	The Texas Co.	LLE Leeville #51	1/11/37	2,348.00	1/2"	35.1	5,897
	The Texas Co.	LLE Leeville #58	2/8/37	150.00	1/2"	35.2	4,383
	The Texas Co. (Gas)	LLE Leeville #60	2/11/37	*			4,203
	Gulf Refining Co.	City of N. O. #4	2/19/37	257.00	Pump	21.2	3,691
	The Texas Co.	LLE Leeville #62	3/23/37	385.00	3/8"	28.2	4,051
Roanoke (Jefferson Davis	Humble Oil & Refg. Co.	Nelson H. Thomas #3	1/1/37	529.92	1/4"	38.8	8,692
	Humble Oil & Refg. Co.	J. W. DeVilbiss #B-6	2/11/37	538.20	1/4"	39.3	8,695
	Shell Petroleum Corp.	J. Kratzer #6	3/6/37	712.80	1/4"	37.4	8,881
Sulphurmine (Calcasieu Parish)	Union Sulphur Co.	Fee #389	1/18/37	400.00	1/4"		
	Union Sulphur Co.	Fee #841	2/27/37	528.00	24/64"	31.1	4,644
West Hackberry (Cameron Parish)	W. T. Burton	Lewis, et als. #1	2/2/37	366.60	1/4"	31.2	4,172
	Stanolind Oil & Gas Co.	Carter & Sweeney #6	3/16/37	283.44	1/4"	34.0	4,225
	W. T. Burton	Rosella Vincent #1	3/31/37	265.32	1/4"	31.5	4,350
	Sutton Oil Co.	A. Portie #1	2/2/37	501.12	1/4"	31.4	4,401

*No gauge given by Texas Co. other than pressure of 1335 lbs.

Ducks Unlimited

Louisiana's Share in the Duck Restoration Program

"Louisiana's Share in the Duck Restoration Program" was the theme of an illustrated lecture by Percy Viosca, Jr., who represented the Department of Conservation at a meeting of the Louisiana Committee for Ducks Unlimited, held in the Dome Room, Roosevelt Hotel, on May 19, 1937. Mr. Viosca showed, by means of lantern slides, the encroachment of civilization upon the great waterfowl wintering areas of Louisiana. Excerpts from his talk are quoted below:

"The plants and animals of Louisiana are derived principally from four sources, the Atlantic and east Gulf Coastal Plain, the Mississippi Valley and the tropics. By far the biggest contribution of the four, however, is from the Mississippi river drainage area. Not only does this vast area contribute new stocks continually to the resident flora and fauna of Louisiana, but the Valley acts as the funnel through which the great flights of migratory waterfowl descend upon us annually to spread out upon our favorable wintering grounds and through which they return to the North in the Spring well fattened for their approaching breeding season.

"Geologically, Louisiana comprises a series of coastal plain terraces, through which has been carved a wide valley, diversified inland by flood plain terraces and along the coast by alluvial ridges, or delta fingers, many of which extend out beyond the former coast line into the Gulf. The general effect of these terraces and ridges is to maintain a ground water table, either near the surface or, as in the extensive swamps and marshes of this state, above the surface. Rainfall and flood waters bring into these shallow basins rich soil elements from the entire Mississippi river drainage area, plant foods which sustain the dense vegetation that forms the food supply for the vast flocks of ducks and other waterfowl which visit us annually."

Distinguished Visitor in Royal Street

One of the largest specimens of dermochelys coriacea (leatherjacket turtle to you) arrived at the Department's museum in Royal Street the latter part of May and was formally introduced to the taxidermists.

The big fellow measured seven feet, three inches in length. Weight, seven hundred pounds. It was taken in the Gulf of Mexico off the mouth of the Calcasieu river by a shrimp trawler, after its head was jammed in a mass of shrimp and fish in the cod end of the trawl, thus preventing it from biting its way through the net.

The record size for this specie is somewhat over seven feet and somewhat over seven hundred pounds, so that the newcomer is at least a contender for the heavyweight championship.

The leatherjacket turtle, sometimes called the trunk turtle and the leather turtle, differs from the other two large sea turtles with which we are familiar, the green turtle and the loggerhead turtle, in that it lacks the plate-like armor of these two species and shows instead a leathery back marked with seven pronounced longitudinal ridges running the entire length of the back. It is larger than the other two also in that the loggerhead runs about 350 pounds and the green turtle about 500 pounds.

The leatherjacket is normally a tropical species, nowhere common but occurring through the tropical and subtropical seas of the world. It has been taken as an accidental straggler in the Atlantic as far north as the coast of Maine. It spends its life at sea, coming ashore only to lay its eggs. It eats sea weeds, crustacea, mollusks and fishes.

Louisiana Salt Water Fish

The production of Louisiana salt water fisheries in 1936 was as follows: speckled sea trout, 225,000 pounds; redfish, 275,000 pounds; sheepshead, 55,000 pounds; flounders, 85,000 pounds; sea turtles, 220,000 pounds; common salt water fish, 200,000 pounds; common salt water fish, 200.000 pounds; crabmeat, 6,000,000 pounds; hard shell crabs, 850,000 dozen; soft shell crabs, 560,000 dozen; shrimp hulls, 2,000,000 pounds; salt water shrimp, 56,453,000 pounds. Estimated value, $4,628,705.

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The Cover Design of This Issue

Our readers are doubtless familiar with the emblem of the State of Louisiana which appears in the upper left-hand panel of our cover, but perhaps less familiar with the scene at the right, the new skyline of Leeville, Lafourche Parish, which gives us an impressive picture of what the oil industry is doing to the topography and adjacent waters of south Louisiana.

In the bottom panel the photographer has caught a typical specimen of the Louisiana salt water shrimp in characteristic pose, antennae rampant. Despite his peculiar appearance and at times peculiar behavior, this product of our waters is fast waxing in popularity as a table delicacy and is surely entitled to a preferred position in our pictorial (piscatorial) design.

-:- Editorial -:-

A Significant Aspect of Conservation

This Department has a vital interest in the new industrial program inaugurated by Governor Leche for the development of Louisiana. While our ostensible objective is the conservation of our natural resources, surely we may extend this to encompass the conservation and development of those mental and spiritual resources which contribute in such large measure to the well-being and happiness of our people.

As we see it, our natural resources provide the background for the attraction of new industry to our state—the judicious conservation of these resources will insure a continuous source of raw materials for many years to come.

New industry means more employment for our people at higher wage levels, an increase in our per capita buying power that distributes new wealth through all strata of society.

With the tendency towards shorter working hours in industry, we are confronted with the problem of providing healthy out-door exercise and recreation for the leisure hours of our workers, especially the younger generation, as a substitute for the seductive and ofttimes vicious pursuits of our current social order.

Here we have in Louisiana the natural resources that make of our state one of the garden spots of the world, a potential playground that cannot be duplicated elsewhere. The rational and orderly development of these resources so that they will provide out-door diversion for all of our people, and insure the contentment of our workers in industry, offers an opportunity and imposes a responsibility of which we are naturally sensitive and appreciative.

Louisiana Mineral Policy Defined

In talking to members of the Interstate Oil Compact Commission, who met in New Orleans on May 10th, Gov. Leche made the interesting observation that while certain resources of the state may be replenished, its mineral deposits, once depleted, can never be restored.

The Governor explained that our wild life may be preserved through a careful husbanding of a few in number of each specie, that our forests may be restored by proper measures of reforestation, but that no scheme or method has yet been devised whereby our mineral deposits can be replaced, once they are taken from the soil and used up. For that reason he thought the conservation of the minerals of the state is even more important than the conservation of wildlife and the forests. Said the Governor . . .

". . . First of all, these resources belong to the people of the state. We are interested in seeing that the people of the state get as much revenue and as much benefit as they can out of those resources. At the same time those deposits are valueless unless they are severed from the soil and go into commercial circulation. In order to do that a large investment of capital is required, in order to produce those minerals and convert them into revenue for the state of Louisiana, and our policy has been and will be to treat as fairly as possible those companies and interests that come in here and make large investments for the purpose of converting our mineral deposits into wealth."

The Governor added that Louisiana is in accord with the principles of conservation as enunciated by the Interstate Oil Compact Commission; that the regulations already effective in this state are in line with those of the Interstate Compact.

The MAGNET

Impelling--Insistent--Inevitable

Certain cycles or intervals in the development of our country have witnessed an accelerated flow of capital and enterprise, marked by an apparent trend of population, towards some particular section, as if unseen forces had conspired to draw them with the mysterious attraction of the magnet.

Here in Louisiana there was such a period preceding the War between the States; when river transportation was in its heyday and New Orleans was the fastest growing city of America—but for forty years after the War the clock of progress seemed to stop, the inflow of new capital and new blood was shunted westward, first to the Middle West, thence to the Far West.

Now we can feel certain unseen forces at work again, with a magnetic attraction that is impelling, insistent, inevitable.

The eyes of industry, north and east, are again turning southward, away from the congested areas where the initial cost of manufacturing establishments is followed by high costs of plant operation, of labor and taxes.

Louisiana occupies a strategic central position with respect to the distribution of its products throughout the south, east and west. It is traversed by a net-work of inland waterways that not only facilitate the movement of interstate commerce but are an important factor in the making of freight rates.

Industrial plants may be located on sites with both rail and water terminals, with barge and steamship service, in inland, intracoastal and foreign trade.

Here we have an available labor supply from stock indigenous to this section. Not newly arrived immigrants so easily influenced by agitators, but descendants of early American pioneer stock, with an admixture of second and third generation of immigrant stock.

Louisiana offers a ten-year exemption from taxation to new industries. Investors, industrialists, men of vision and enterprise everywhere, will want to get in on the "ground floor" of this new development, sponsored by Governor Richard W. Leche.

The magnet is pulling—why resist it ?

Department of Conservation

126 NEW COURTHOUSE BLDG.,

New Orleans, La.

Louisiana Conservation Review

Don't Pay Any Attention to Her!

With her insouciant smile and fur coat of Louisiana muskrat she is trying to bewitch you. But don't pay any attention to her. Come down to earth and consider the following facts:

Louisiana supplies 75 per cent of the muskrat pelts of the United States. 6,000,000 muskrats, valued at $6,000,000, have been taken in a single season.

There are 20,000 trappers in Louisiana, 500 fur buyers, 50 fur dealers—50,000 people dependent on the fur industry for a livelihood.

This is one of the many unique industries of this state, with its great natural resources—it may suggest to the enterprising business man, manufacturer, wholesaler or retailer, a new location for his establishment.

With 7,000,000 acres of marsh land, of which 458,000 are state game refuges, Louisiana is the ideal winter harboring place for the wildlife of America.

Detailed information may be obtained from Gov. Richard W. Leche or by writing to—

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